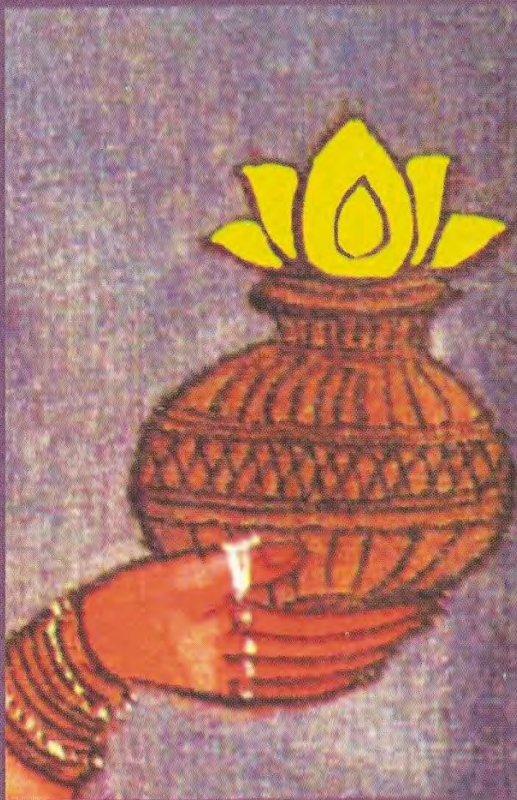


॥ ayurveda ॥
at the crossroads
of care and cure



Ayurveda at the Crossroads of Care and Cure

Edited by

A. Salema



LISBOA & PUNE

Centro de História de Além-Mar
Universidade Nova de Lisboa
2002

Ayurveda at the Crossroads of Care and Cure
Proceedings of the Indo-European Seminar on Ayurveda
held in Arrabida November 2001

Editor: A. Salema
Revision: Luis Filipe Thomaz
Publisher: Centro de História de Além-Mar
Universidade Nova de Lisboa
Av. de Berna, 26C 1060-061 Lisboa
Portugal
Email: cham@fcsh.unl.pt
1st Edition: November 2002
ISBN: 972-98672-5-9

CONTENTS

Introduction	
A. Salema	1
Diseases in Ancient India	
M.S. Valiathan	18
Doctors as characters in Sanskrit narrative literature	
C. Malamoud	24
Garcia de Orta and his work in the field of drugs and medicinal plants	
K. Raghunathan	31
<i>Cannabis</i> in Traditional Indian Herbal Medicine	
Dominik Wujastyk	45
Evidence of the Use of Ayurvedic Medicine in the Medical Institutions of Portuguese India, 1680-1830	
Timothy Walker	74
Evolution of basic principles of Ayurveda	
P. M. Varier	105
A review of the concept of <i>pitta</i>	
K. Raghunathan	116
The concept of <i>pañcamahābhūta</i> and its applications	
Kedar Shende	140

Challenges in Developing Medicinal Plant Databases on Ayurveda	U. Payyappallimana	155
New approaches to ayurvedic drug development	R. Kumar	167
Effect of Kerala systems of snehana and <i>svedana kriyās</i> in degenerative diseases	P. M. Varier	178
Reflections of a psychiatrist on ayurvedic therapies	Mário Simões	188
Traditional protocols in <i>pañcabhautika</i> diagnosis and treatment	Kedar Shende	196
Validation of Ayurveda: Limitation of the Current Cross-Cultural Medical Approaches	U. Payyappallimana	206
Classical Ayurveda and its modern practice: Study and fieldwork of Ayurveda in India and in America	Kenneth G. Zysk	218
Patterns of encounter between Ayurveda and modern medicine	Shrinivas Tilak	229

Opportunities and limitations in globalising Ayurveda	
R. Kumar	266
Participants	275
Index	281
Botanical Appendix to Index	287

ABBREVIATIONS

<i>Aṣṭāṅga Hṛdaya</i>	AH
<i>Aṣṭāṅga Saṃgraha</i>	AS
<i>Bhelasamhitā</i>	BS
<i>Carakasamhitā</i>	CS
<i>Kāśyapasamhitā</i>	KS
<i>Suśrutasamhitā</i>	SU
<i>Cikitsāsthāna</i>	Ci
<i>Nidānasthāna</i>	Ni
<i>Śārirasthāna</i>	Śā
<i>Sūtrasthāna</i>	Sū
<i>Uttara Tantra</i>	Ut
<i>Vimānasthāna</i>	Vi

INTRODUCTION

AYURVEDA AT THE CROSSROADS OF CARE AND CURE

This Indo-European Seminar on Ayurveda was held in Portugal – that part of the world with a long history of contact with India and its *materia medica*. Yet, Ayurveda and other Indian healing practices are relatively unknown there at present. As such, if at its spurt this seminar appeared to be a bold venture, in fact, it was not so, as the way its holding was so generously welcomed, sponsored and prompted¹, was simply a display of the Portuguese tradition for transcultural meetings since the 15th century: daring the unknown, creating the new.

1. Trans-cultural epistemology: across space and time

Being aware of the critical socio-cultural dimension of problems raised by the current transplantation of Ayurveda, the scope of the seminar was, at the outset, of cross-cultural medical epistemology. Inescapably, a cross-cultural epistemology opens varied sets of problems headed by those concerning the possibilities of *meaning* - even if and when the questions raised by the ayurvedic phrasing go well beyond a strictly linguistic setting.

The first and foremost problem in the effort to find footbridges of intelligibility and communication, still largely open for debate, is the one of translatability of Sanskrit terms into European languages. Beyond this, and specifically concerning ayurvedic practice and experience, is the issue of minimising the ambiguity and the equivocity arising from phrasing the various aspects of the healing experience that is essentially subjective.

Secondly, ayurvedic lexicon was originally a local production meant for local use. The manipulations to which ayurvedic terms and texts

¹ Centro de História de Além-Mar, Fundação Oriente, Ministério para a Ciência e Tecnologia e Departamento de Ecologia Humana da Universidade de Évora.

are subjected today displace them forcibly from their context to match our intellectual world, mainly through often overlapped operations of translation and modernisation. Their "dislocation" fades the milieu, the context and the atmosphere from which the word emerged, and it appears far from the cosmophysical foundations that sustain it, the modes of thought that articulate it, the social interactions that legitimise it and completely off from the technical operations that verify it. Transferring to other domains apparently strict philological questions, the translation is always a negotiation of differences. Actually, interrelating supposedly comparable images and experiences of the world, seeking the passage from the different to the same, translation ends up making them equivalent. This maneuver is naturally conditioned by the philosophical *a priori* – an optimised formula of philosophical prejudices – of the translator. The translation, while pretending to mirror a language in the light of another language, gives shape to the translator's iconic and cognitive experience: amoebas, enzymes, albumen, hysteria, etc., tinge the initial text with a different colour, far across its original time and space. Thus, the medical metalanguage confronted with insoluble problems of translation, welcomes the multiplication of non translated words.

Forgetting that science, like all other practices, is also conditioned by a set of conventional rules liable to change according to the need of the hour, its unquestioned investment as a metarule for all other practices is the third problem we have to deal with. Naturally we confront problems of methodology and technology when we try to find out what in Ayurveda corresponds (or responds) to the equivalent technology in vogue in the bio-medical science. A related problem is to decide with what instruments this transportation can be realised and coherence fixed. An inquiry about those aspects that do not correspond to any conventional methodology or to any transposable technology within the bio-medical paradigm, would bring us to the realisation of which broad epistemological paradigm these methodologies would respond.

Moreover, before any kind of meeting between different epistemological paradigms with their differing sets of practices and experiences – often mutually incommensurable –, a necessary space for

their coming together has to be created. In which way is it possible to welcome, receive, invite, or import alien medical paradigms? Conversely, in which way would it be possible (or convenient) to offer, transpose, decant or export one medical paradigm into an alien one?

Since the transcultural movement of the day enables - and sometimes forces -, the meeting of different health systems, we are bound to find a zone within which they may bridge their gap and intertwine their efficacies for care and cure. Particularly because their movement takes different directions – seldom complementary in their opposition – which need to be harmonised: reception and exportation. Sometimes these movements - from and around the traditional or scientific technological knowledge - give rise to encroachment, sometimes to entanglement, sometimes to exchange, but rarely to coincidence. Despite and against such basic restrictions, a wider space needs to be opened up for the confrontation of idiosyncratic paradigms and technologies. Actually we see in the classical ayurvedic texts that symposia and controversies have always been the norm. Unlike the present contentions they were devoid of the ambition to silence all *differend* imposing an opinion on the other with the contest of a proof. The *āyurvedin* knew that proofs – any proof, is partial and biased to be easily replaced by another that would testify the fact otherwise. Across the millennia, the words Punarvasu addressed the sages of yore assembled for one of such conferences, still stand relevant:

Do not argue thus because reality can be arrived at only with difficulty by clinging to a partial view. Those holding fast to propositions, and their refutations as proven, cannot close a discussion, like the oil press does not attain the end of its movement.²

2. Main trends of the Classical Ayurvedic Paradigm

² *Tatharṣiṇām vivadatām uvācedaṃ punarvasuḥ / maivaṃ vocata tattvaṃ hi duṣprāptaṃ pakṣaśaṃśrayāt // vādān saprativādān hi vadanto niścītān iva / pakṣāntaṃ naiva gacchanti tilapīḍakavad gatau Carakasamhitā, Sūtrasthāna, 25.26cd-27*

Ayurveda assumes a fundamental continuity among all elements of the universe, because it is founded – conceptually and experimentally – on fluid exchange between the environment and the body, which, not being limited by the skin, opens to the outside, spreading farther and everywhere, finds adhesions to everything that surrounds it. It is a symbiotic space where flows (*doṣa*) and particles (*aṇu*) meet in motion. Man is seen as an integrated system in a plurality of systems of which the social and the ecological are the most easily evident. "Integrated" means interdependent through a wide network of interrelations, competitions and control.

The theory of the five elements and their differentiation is the basis of all bodily experiences. The world is conceived as a differentiated derivation from the five "big transformed elements", the *mahābhūtas*. They are composed or intermixed in innumerable ways, producing and constituting all beings and all objects. In the innermost folds, it is always one of the *mahābhūtas* that will be found, each of them possessing a particular structure that distinguishes itself from the others. They yield to perception with the mantle of distinctive qualities – *guṇa*. The predominance of the earth appears by heaviness, solidity, toughness or slowness; the predominance of water by fluidity or viscosity; the predominance of fire by heat or subtlety, and so forth.

There is a learned and technical specification of *rasa* or of *guṇa* expressed by a vocabulary that articulates their collective and individual experience. Words correspond at the same time to a scholarly systematisation and to the particular sensory experience of individuals. This is how the world is savoured as well as known. And not only does the gustatory sensation reinforce the interaction with the world, but also that all sensation is a *touch*, according to the different perceptive experiences. *To know* is to make contact and perception is a multi-form tact that cuts up shapes in the world in order to know it.

The living system that Ayurveda presents us with is open, continuously exchanging information with the environment. It is therefore subjected to all sorts of variations and characteristics of a fluctuating system. The physician can direct these fluctuations if he masters the critical

thresholds of bifurcation where the dynamic structures of the system topple to create a new order, and where the system runs the risk of being transformed or destroyed. So the therapeutic activity, resting on the energetic and vibratory conception of the world, acts upon the various vibratory supports such as the energetic fluids, the *doṣas*.

The kinematics of the classical atomistic model of Ayurveda consists fundamentally in the arrangements of elementary particles. Their association and dissociation determine the different shapes of phenomena that some call bio-physico-chemical. The action of the *vaidya* on their temporal evolution presumes a large number of steps wherein the degree of precision is important, given the number of variables that determine the dynamism of the human system. Ayurvedic practices show that the human living organism is an organically integrated system, the complexity of which is nevertheless accessible to the medical enterprise acting on segments of the causal chain, articulating the living organism with its milieu, according to two main devices: *sāmānya*, what is common, and *viśeṣa*, what is distinct. These are the most important categories of Ayurveda that govern the mechanism of the whole system. Every ayurvedic manipulation – be it the administration of a drug, an emetic or a massage – is performed according to them. What is distinct decreases, what is similar increases. They are indeed the most important principles of its pharmacodynamics.

The set of circuits that compose this global human system is susceptible to changes, occurring firstly in the intertwining zones, and progressively engulfing the whole system, region by region. It is a transmission of "information" capable of provoking the change in its global condition. In those zones, some microscopic fluctuations, some small differences, succeed in provoking a new regime of functioning of the whole system. The *vaidya* is endowed with such empirical knowledge: small causes, imperceptible changes, can produce excessive effects, without being directly proportional to them. Above all he knows that at the micro level elements composing the body are rather fluctuating forms that are very sensitive to disruptions and are bound to change under certain conditions.

Such is the form of fluids which, unlike solids, is bound to be easily deformed.

The *vaidya* manages to act firstly on the fluid forms (*sattva* or *manas*, *rajas* or *tamas*, *doṣa*) and then on the solid forms (as those of *dhātu*), more resistant to changes but whose infinitesimally oscillations may be amplified, introducing some important qualitative macroscopic changes. The mechanisms of these changes are generally unknown to modern science because numerous bio-physico-chemical features of the living matter remain inaccessible to the laboratory processes of verification by our technological devices. Some of them were inaccessible to *yukti*, the ayurvedic reasoning process as well. They were therefore declared *acintya* (inconceivable) by the old texts, as for instance the change gear produced by mantras, gems, etc. The fluidity of the world wherein the physician, the patient, the act or the drug occur, corresponds to the fluidity of beings and processes, the *saṃsāra*, the driving and the driven fluidity *par excellence*. The theories of *triṣṇā*, *tridhātu* and *tridoṣa*, with their interactions, are theories of deviations in fluid environments. The medical act tackles the *tridoṣa kupita* to control collisions, displacements and dissipation, in order to bring them back to the balance of their out-flow without turbulence.

The rules of formation, transformation and realisation of ayurvedic practices are complex and differentiated, but nevertheless they can be analysed and understood. Some rules act on the body, the world and the person, while others act on their *image*. The former could be named material; the latter could be named immaterial. The material practices represent the most important part of ayurvedic operations. They show some points of contact with our medical facts, but many have nothing in common with them, due to the dependence of bio-medicine on the laboratory procedures that progressively disconnected the patient from his illness. It is not only that this approach erased the subjective side and the patient's active responsibility, but also disintegrate and dislocate the set of the systems that produce the illness. Thus, on the one hand we have the ill person, called *patient* – a heedless subject on whom a quasi-transcendent illness comes to implant itself, and on the other hand, we have a set of organ functions, presumably autonomous, dissected or measured in a

laboratory. The opposition of *patient* and *illness* swept away the pre-scientific "psycho-anthropology", and thus newer and newer orders of invisible structures emerged, addressing themselves to molecules, micro-organisms, antibodies, and to all kinds of laboratory beings, but not to the patient who suffers. The trial he undergoes, or the experience by which he shapes his illness, ceased to be of interest to this medicine that does not accept the patient as a sufficiently valid witness of his own illness.

To the contrary, the classical Ayurveda that considers the patient responsible for his *duḥkha* (be it illness, misfortune or evil), is centred on the person – as a correlative and integrated system – and not on the illness itself. It addresses simultaneously the patient who suffers and the elements that trigger his trouble: *doṣas*, food, *bhūtas*, passions, etc. Whether for the endogenous or for the exogenous illnesses, it is always a "default to wisdom" (*prajñāparādha*) which is at the source. It is therefore the responsibility of the patient that is entirely engaged there. Ayurveda applies to what one could call the *total medical fact*.

Thus, in addition, the passing down of classical Ayurveda, recorded in texts composed in a time and age that defy our historical arrangements, went around only through *gurukula* system – the only process of transmission. On this, the health system set up by the British regime, the urban development and the transcultural pressures for homogenisation, have carried out important transformations. Thus, it so happens that Ayurveda became a "prey" to strong interest, developing rapidly during the recent years, both as an epistemological object and a consumer product to be marketed. It goes without saying that the Ayurveda that reaches us in these meetings is no longer the same.

3. Transport of Medical Paradigms: the bridging research

Since we were confronted in this debate with questions that are, in Western culture, object of scientific treatment, we had first to recognise that classical Ayurveda is not a *medicine* in the sense of the term prevalent in modern Western culture. Everyone knows that the issues at large are about the wisdom of life, and life is not there fully medicalised. Often, however,

to make speech more accessible or easier to approach, one is used as a substitute for the other. Then, when this initial diversion is forgotten, we are surprised to find in the Ayurveda moral rules, rituals, yogas, demonologies, the non-scientific nature of which should supposedly exclude them from the medical field. Indeed, the language in use today is inevitably displaced. Displaced because it refers to Ayurveda with the help of a lexicon that carves and classes its material according to terms that are more or less foreign to it. Accepting this basic condition, we must avoid as far as possible the ensuing dangers of homogenisation. Secondly, the ayurvedic "bio-physico-chemistry" has no possible comparison with the knowledge of these domains in the techno-industrial cultures. It exceeds each of these fields of knowledge, opening a zone where divergent sets converge, weaving themselves in order to form the human living system in its environment.

Nowadays, the unprecedented interest in Ayurveda makes us bear witness to two major situations. Firstly, and concerning ayurvedic practices, how in India research centres, that apply ayurvedic treatment for diseases typified by the biomedical paradigm (as AIDS, cancer, diabetes), claim an identity of diagnostic procedures mostly incommensurable, how in Europe are spreading the clinics of ayurvedic doctors (who regularly fly to impart ayurvedic treatment for all sorts of diseases and illnesses), and how European health professionals perform "ayurvedic" diagnostic and treatment often after a few months of training in ayurvedic centres in India.

Secondly, we also see how the official trends for modernisation of Ayurveda are being strengthened. They have been explicitly defined these last few years by the Gujarat Ayurvedic University (GAU),³ almost taking the position of official spokesman, and in this seminar by Shrimati Shailaja Chandra,⁴ who made a large presentation on today's efforts to multiply protocols through the progressive subjection of almost every field of ayurvedic development to the scientific technological patterns of validation.

³ That claims to be the only Governmental University fully devoted to Ayurveda. Cf. Gujarat Ayurved University News Letter.

⁴ Head of the Department of Indigenous Systems of Medicine as Secretary in the Ministry of Health, Government of India.

Thus, contemporary research on Ayurveda is primarily to validate Ayurveda through the rationality and objectivity of Western science, to find out whether Ayurveda has a scientific basis and whether ayurvedic methods can be standardised to suit the contemporary demands, as briefly pinned up below.

- Project Ayurveda globally as a system of medicine based on strong scientific footings
- Project Ayurveda on scientific lines with modern equipment
- Develop the methodology of ayurvedic formulations as per the requirement of importers
- Globalise ayurvedic education by discussing syllabus for ayurvedic institutions abroad, developing a global uniformity in ayurvedic education
- Set up a Traditional Knowledge Digital Library
- Launching an Ayurvedic Medical Kit for rural population
- Promote Intensive Re-Orientation Training Programme for teachers to master their subject
- Make CDs of ayurvedic subjects to be used as effective teaching tools
- Equip laboratories with the latest instruments to establish world-wide acceptability for research standards
- Make easily palatable, portable and immediately effective drugs – as the pharmaceutical industry is doing – to promote and propagate Ayurveda in India and abroad
- Reform the teaching methodology to adopt modern teaching tools and techniques for a better understanding of ayurvedic subjects
- Eliminate the disparity between the allopathic system and the ayurvedic system of medicine
- Developing an export market in the global international herbal market

Facing this main trend towards modernising, a concern that gave way to the debate was to understand the stakes in such an effort – called a

"bridging research" effort⁵ – to develop experimental models that introduce western rationality into a field that was not originally drawn through them. Thus, it so happens that some modern clinical research studies choose patients of *cittodvega* (lit. psychic agitation) based on DSM IV criteria of diagnosis, while others try to connect the symptom complex of *āma* (lit. raw) with the increase in free radicals. Moreover, it is being accepted without discussion that Ayurveda can only be taught at Universities (where Western parameters and patterns are increasingly replacing local ones), thereby erasing the direct method of *dīkṣā* and the relation of *guru/śiṣya* of the *gurukula* system. Simultaneously, the weak presence of Indian representatives in bio-diversity committees of United Nations seems to point out that the general priority of the day is rather to "modernise" than to protect diversity of beings, techniques or traditional knowledge.

4. Many paths on the way

Of the many sides of ayurvedic import/export, we left aside its market and related networks (even if they are dangerously spreading and infecting the teaching, research and clinical fields), that call for an altogether different approach. We rather considered such domains as history and textual exegesis, fieldwork, development of herbal and non-herbal preparations, elaboration of databases on medicinal plants, discovery and patenting of bio-molecules from ancient plants. Since monochrome talks would not serve to widen a deep and large discussion, the participants in this seminar were invited from different backgrounds, with varied training, ages and perspectives. Ranging from the medical field to the anthropological one, from history to engineering, they offered a very wide spectrum of colours and multiple voices, which were both, often and seldom, consonant or dissonant.

Four differentiated groups of papers covered four different sets of approaches to the main questions subject to debate. As a starting point, a very complete picture of diseases and doctors in Ancient India and of the

⁵ Cf. *infra*, p. 206.

intertwining of ayurvedic knowledge with indigenous and alien institutions was depicted. Comparative epidemiology and medical ethics showing that, as far as therapy and conceptions of the body and life are concerned, traditional Indian medicine and modern medicine are basically different. But concerning the physician's power the situation is exactly the same, as professor Malamoud has shown.

This historical overview was complemented with a comprehensive and in depth knowledge of those basic principles of what we could call ayurvedic bio-physico-pharmacology and its clinical applications. Imparting invaluable information to fix a common ground to the subsequent discussion, some papers revealed in parts the process of modernisation within ayurvedic acting (or at least of ayurvedic phrasing). We remember for instance Dr. Raghunathan explaining *sādhakapitta*⁶ or Dr. Varrier adopting the bio-medical terminology of CCRAS⁷ when he elucidated the peculiarities of Kerala therapies.

The third group, setting out on the general conditions of the crosscultural encounters between Ayurveda and bio-medicine, stressed the rich diversity of Indian knowledge systems and medical tradition. Their pluralism, that underwent a process of hierarchisation under the British rule, is nowadays subject to very strong power games. Therefore the most of the ayurvedic works of the last three centuries show less interest in the ways of diagnosing and treating new diseases than in the systematic comparison of ayurvedic disease entities with bio-medical disease taxonomy. One possibility of disentanglement of this hierarchisation could be shown by the new narrative approach of social sciences claiming that medical phrasing of dis-ease individual experience (precisely because it is an event occurring in unique individuals) is complex and shaped by cultural conditions. In this way iconic experience, social interactions, gender or religion would prevent a common reference to strictly biological facts.

The fourth group put forward the main trends for modernisation and validation of the already modernised Ayurveda. And here a very wide set of problems was introduced through quite varied voices polarised

⁶ Cf. *infra*, p. 130.

⁷ Cf. *infra*, p. 184.

around two main trends. Assuming that herbal drugs – more and more internationally demanded – could be used by any system of medicine, irrespective of its origin, the first stand, taken here by Professor Kumar, claimed that some protocols have to be set up for testing both the efficacy and safety of these drugs, hoping that *The existing preparations will be better characterised chemically and biologically and their safety assured. Most future preparations will be trimmer, molecularly defined and will incorporate synergism as an important feature. They will be based on international rather than Indian bioresources, and will be exploitable both by Ayurveda (through whose philosophy they will be designed) and other systems through whose protocols they will be additionally tested.* This supposes, obviously, that *to improve communication among experts, efforts are needed to generate equivalence for a disease between the ayurvedic description and results obtained through modern diagnostics. Further, there is need to collect clinical data and present it in a form acceptable to other systems, which would show the efficacy of ayurvedic treatment for various diseases.*⁸

This trend projects to demystify, modernise and globalise Ayurveda following parameters of biomedicine. But globalisation, if any, should not prevent endogenous development and growth, just as bio-prospecting initiatives should not deprive local natural resources taking them over. True that Ayurveda should be modernised without being exposed to the forces of Westernisation and that any change should be consistent with India's social, moral, and cultural ethos. But how to bring this about? Specially at a critical moment where some *vaidyas*, represented here by U. Payyappallimana, regret on one hand that

the most of the studies on ayurvedic materia medica happens to be a "drug hunt". This means that ayurvedic materia medica is looked at as a mere treasure house for seeking herbal solutions for present day problems. This treasure hunt is carried out without having sufficient studies on the wider epistemological

⁸ Cf. *infra*, p. 277.

*base of these formulations in Ayurveda. In Ayurveda it is not the drug that matters but a detailed method of management of a condition through drugs, diet and lifestyle changes. Where as present method seeks only remedies/drugs and not the management methods.*⁹

Indeed disease occurs not in the body, but in life, in time, in place, in history, and in the context of lived experience and the social world, as Shrinivas Tilak accurately reminded us (*Caraka* Vi, 8. 92). Such deep rooting of Ayurveda seems to have already become alien to some modernised *vaidyas*. On the other hand these *vaidyas* regret also

*the poor understanding of a nosological entity within the ayurvedic community. Conditions such as raktapitta, pāṇḍu, prameha, visarpa, vātarakta, āmavāta, etc., are not properly understood within the system. It is also noted that there is no common understanding of these disease entities across different institutions in the country. This is not a weak point of ayurvedic description of a condition in the classical literature but an attribute of present poor ayurvedic education system, which is emerging having no clear vision in the area of Ayurveda.*¹⁰

Then, it goes without saying that some apprehension is rising in the orthodox milieu regarding the modernization of Ayurveda without right understanding of its wider grounding.

Thus, ayurvedic community itself already speaks many languages within a wide spectrum of finely-shaded patterns, as the modernised one – in colleges and universities, research units, clinics and pharmacies – adopting to some extent, not only the bio-medical discourse but also its technology. On the other hand, not so much in geography, there are those *vaidyas* who ignore everything about hormones, AIDS, genes or virus, do

⁹ Cf. *infra*, p. 210.

¹⁰ Cf. *infra*, p. 209.

not use stethoscope nor sphygmomanometer, collect and/or prepare their own drugs and bow down to their *gurukula* and to its lifestyle.

This sort of erosion of ayurvedic knowledge, with the replacement of ayurvedic technologies (*āptavacana* being replaced by molecular definition, for instance), responds to the outside pressure for validation through alien (and odd) parameters. Such modern erosion is concomitant with the erosion of the worldview that sustains traditional Ayurveda. While the ayurvedic community is being asked to be innovative from within, what is being done is something else.

In the context of knowledge, practices and experiences (KPE) discussed here, we need to better understand the relevance of current issues involving their production, circulation and validation. Teaching and research are the main formatted areas of any already existing knowledge. While innovation will derive its growth from endogenous KPE (by means of new links¹¹ or new approaches of present globally changing conditions of life itself), modernisation will compel its development under the pressure of exogenous KPE. The change in the criteria for the production of drugs may also be illustrative of this: appealing presentation, palatability, etc., as well as the franchising of ayurvedic courses here and there, shows the definite flow in the dynamic stream of international market.

The practices, mainly those of clinical activity (with its concomitant drug preparation, whether at an individual or collective scale), are nowadays extended to laboratorial experimentation and are thus generally subject to the features applying to the production, circulation and validation. In this way validation may also involve invalidation of old validating parameters. If the domain of the experience still remains at a distance from these stakes, the ayurvedic practices are at the core of the threatened zone. It clearly calls for an encompassing endogenous definition of basic validating parameters, or for the acceptability of already exogenous

¹¹ As attempted here, the so idiosyncratic polynomial system of nomenclature of local traditions (leading to many misinterpretations and controversial identities of plants) that still awaits in-depth correlation studies in plant nomenclature between Ayurveda and Botany. Cf. *infra*, p.210.

defined ones. It is not the abstract validation, once for all, but a local one, here and now, case by case, that should to be sought.

5. Bridging knowledge, practices and experiences

The purpose of this seminar was to contribute towards the exploration of a multiple interface that would overcome the main problems emerging in the field of ethnomedicine from the three different orders, viz., knowledge, practices and experiences, to which their production, circulation and validation are subject. Already quite complex within a given culture, they become indeed problematic at the crossroad of cultures. Aware of the potential power of such crossroads, as well as of the potential fragility of their diversions, the focus of the hour seems to be the creation of some sort of an interface where ethnomedicines and bio-medicine can have a meaningful encounter, with an efficient outcome for the understanding of local and global health. Such encounter unfolds at different levels: clinical practices, technologies and validation parameters.

Then, as a conceptual approach of contemporary experimental events, this meeting still failed to find out that methodological interface between knowledge, practices and experiences. It could possibly be overcome by some sort of "field work" as the conditions for a new intelligibility presuppose a new operative mode in order to assign it a place in the wide landscape of contemporary knowledge, that cannot be anymore only a European or Western one. That new understanding is still awaiting to come of age.

In one of the debates at the University of Évora, the queries addressed by Professor Silva to the speakers, tinged with gentle challenge and wisely disconcerting them, generally suggested a few important points. Firstly that Ayurveda could be an important way of renewing the link – through the exotic – with the already exotic of our own medical origins, buried into the most obscure zone of knowledge by modern science. Secondly that some attempt could still be made to save from decay the healing process as an *empirical art* – so local, individual and subjective. Thirdly that the "consenting" interest of Western medicine conspicuously

shows a severe crisis of the scientific biological paradigm : a "symptomatic" phenomenology of therapy.

On these grounds the healer would appear as an artist or a magician, not as a scientist, restoring the harmony and balance between life and death – not between different qualities within life. And Professor's Silva last question could be taken as a pointer for further *active reflections* on the issues of these papers: is it because the future medicine is not there yet that, **in the meanwhile**, the healing demand seeks, and looks through, for a holistic co-operation with other medical systems?

Indeed, if the disease is an "event" produced by a cluster of micro-changes globally acting as causes, openly discarded by the sectorial bio-medical manoeuvres, it may so happen that the issue of contemporary movements bridging Ayurveda, bio-medicine and any other system of medical care, will shape the doctor both as an *artist* and as a *technician*. Moving from within all possible experiences, in that kind of "impregnation" that makes the clinical experimentation so unique, and in a close syntonisation with the living world, he would be, also, an expert in all sorts of available local technologies. Their application would depend on the set of conditions present at the exact place and moment of the healing act.

We do not have to choose anymore between two or more different sets of medical knowledge, practices and experiences, between their orthopraxies or heteropraxies, between "them" or "us". We are already in that zone that cuts across the geography of all maps, but not yet across time of all calendars. Such a choice is not a problem anymore. And yet, our *hic et nunc* overbridging point, is knowingly rooted in the unknown. We may figure out very precisely the future development of marketing issues (that means export/import and bio-prospective initiatives in a modernising and globalising execution) as far as general knowledge and practices are concerned. But how to figure out the subtle subjective experiences that will be made possible by these major changes? That is the very hinge of all possible movements for caring and curing, for being cared and cured, of the polychromic healing experience as an integrated or systemic experience.

Actually, we find ourselves at a crossroad merely when we move on those gross domains of general knowledge and practices (subject to

production and circulation) because towering above them, we are at a bridge, at a frail and delicate footpath bridge: creating the new, daring the unknown.

Ana Salema

DISEASES IN ANCIENT INDIA

M.S. Valiathan

Manipal Academy of Higher Education
Manipal

Introduction

Ayurveda is the traditional system of medicine of India and an important part of her cultural inheritance. Tracing back its origins to the *Atharvaveda* (ca 1500 BC), Ayurveda had become a major discipline for study at Takshasila which drew students from far and wide even before the advent of the Buddha. Buddha indeed referred to many procedures of Ayurveda in his dialogues even though the term itself was not used. When the bells of the first millennium sounded, Ayurveda counted among its assets authoritative *Samhitās* which laid down an elaborate system of medicine embracing anatomy, physiology, disease processes, medical and surgical treatment, preventive medicine and much else. However, far from being a curious historical relic, Ayurveda is a vigorous health care system in India today. The following table speaks for itself.

Table 1

Ayurveda Summary of Current Status (2007)	
Hospitals	2398
Beds	42963
Reg. Practitioners	453661
U.G. Colleges	240
Student Admissions	7070
P.G. Colleges	62
Student admissions	991

Having taught and practised cardiac surgery for the quarter of a century, my credentials for making an introductory presentation at this meeting rest on the foundations of a study I carried out for two years in the recent past. The subject of my study was the *Carakasamhitā* which is a foundational text of Ayurveda. There seems to be a scholarly consensus that Caraka lived in the 1st century AD or, at any rate, in the Kushana period. According to his own explicit statement, his *Samhitā* was a redaction of an older text called *Agniveśa Tantra*. Parts of *Carakasamhitā* were lost in course of time and the text was revised and completed by Dṛḍhabala in 4th century AD. The *Carakasamhitā* became a standard textbook of Ayurveda and was translated into Arabic and Tibetan in the early centuries of the Christian era. An encyclopaedic book on internal medicine, *Carakasamhitā* also stands out by the philosophical slant and vigour of its discussions, direct style and quiet authority.

1. Caraka through many windows

Caraka presents many facets which would be viewed differently by scholars of diverse persuasions. A historian would seek to know his real name, the period he lived in, his theatre of activity and then proceed to examine questions such as his identification with Patañjali and companionship with King Kanishka. A philosopher would be interested in Caraka's epistemology, his concordances and discordances with *Nyāya* and *Vaiśeṣika* systems, his Buddhist leanings, his views on free will and similar questions. A medical scientist would be drawn to Caraka's descriptions of bones and viscera; his discourse on embryology; his ideas on digestion, circulation and basic concepts such as *pañcabhūtas* and *tridoṣa* which correspond to structure and function. A physician would study Caraka's encyclopedic description of diseases and their management by a variety of therapeutic measures. He would also look with interest at Caraka's vast herbal formulary and his views on the pharmacologic basis for the choice of therapeutic formulations. Not to be outdone, a philologist would carry out a textual analysis of *Carakasamhitā* and strive to disengage

the layers added by Dṛḍhabala and Caraka to its forerunner – *Agniveśa Tantra*. Like 'man the unknown', the schemes put together by various specialists would nevertheless leave behind a Caraka the unknown! Through my window I have taken a look at the diseases prevalent in Caraka's time.

2. Diseases in Caraka's period

Epidemiology or the profile of diseases in a community is of great interest to not only physicians but also social and science historians. It tells us about diseases of long ago which are no longer seen or which may have changed in virulence; it points to current diseases which did not exist in the remote past and might have made their entry from elsewhere in later years; it gives clues to natural disasters such as earthquakes or man-made calamities such as wars, slave trade, expeditions and so forth, which spawned diseases. To study the pattern of diseases in Caraka's time, we are obliged more or less to restrict the search to the internal evidence in *Carakasamhitā* as Caraka's exact period remains controversial. In other words, the study would be an exercise in textual epidemiology as the data sources for the occurrence of diseases in Caraka's time, would be confined to the *Carakasamhitā*.

The rationale for the above approach to the historical study of diseases is straightforward. A text book of medicine written in the early twentieth century would have devoted several pages to diphtheria, cholera and small pox, far fewer to coronary artery disease and cancer, and none to AIDS. A successor edition of the book a hundred years later would contain no more than brief references to diphtheria, cholera and smallpox; it would have greatly expanded references to coronary artery disease, cancer and AIDS. The importance given in an authoritative text to a disease is therefore an indirect, but reliable, index of its incidence and its impact on contemporary mortality and morbidity. It would thus be possible to sketch an epidemiological picture of northwest India in Caraka's time on the basis of his references to various diseases. As diseases are numerous, it is

however necessary to choose a representative sample. What should be the basis for the choice?

Diseases are as old as man and share his long history. Throughout history, societies are known to have passed from a stage when infectious diseases such small pox and flague decimate populations for a later time when non-infectious diseases such as cancer and heart disease replace infections as the major, but slower, killers. This is a universal rule with no known exceptions, and the process of change has been called epidemiological transition. In looking at the diseases in Caraka's time, it would be logical to survey samples of pre and post transition diseases on the basis of the references in his text. A search of diseases based on textual references was made possible for me by a digitised version of the *Carakasamhitā* supplied by Prof. Yamashita of the Kyoto University. The samples of infectious diseases and infected conditions (pre-transition) and non-infectious diseases (post-transition) chosen for the present analysis are shown in Table 2 and 3.

Table 2

Infectious diseases and infected conditions

1. Digestive disorders (*grahāṇī*)
2. Fevers (including complex fevers) (*jvara*)
3. Leprosy and skin disorders (*kuṣṭha*)
4. Small pox (*masūrīka*)
5. Tuberculosis (*śoṣā*)
6. Abscess (*vidradhī*)
7. Cellulitis (*visarpa*)
8. Cholera (*visūcīkā*)
9. Ulcer (*vraṇa*)

Table 3

Non-infectious Diseases

1. Epilepsy (*apasmāra*)

2. Piles (*arśa*)
3. Gaseous lumps of abdomen (*gulma*)
4. Heart disease (*hṛdroga*)
5. Alcoholic disorders (*madātyaya*)
6. Disorders of pallor (*pāṇḍuroga*)
7. Polyurias (*prameha*)
8. Bleeding disorders (*rakta pitta*)
9. Insanity (*unmāda*)

3. Analytical findings

Figures 1 and 2 represent the number of references to pre and post transition diseases in the *Carakasamhitā*. While a detailed analysis of the findings is beyond the scope of this paper, a few salient observations are noted below:

1. The total number of references to pre-transition diseases is 888; in contrast, the references to non-infectious diseases total 580. This is on expected lines.
2. In the pre-transition group, malaria and typhoid are dominant among fevers; tuberculosis was rampant; small pox and plague were probably not prevalent if non-existent. Cholera was not virulent.
3. In the post-transition group, intestinal obstruction, gastrointestinal bleeding, piles were common; epilepsy and mental disorders were clearly distinguished from each other; among many types of polyurias, diabetes mellitus was prominent; heart disorders could not be correlated with heart diseases as known today.
4. Insanity included several psychiatric conditions recognisable today.
5. Apart from analysing the list of references, one could also get interesting gleanings on other diseases from the *Carakasamhitā*. For example, the relationship between environmental degradation and the onset of epidemics was not only recognised but the human responsibility for degradation was also clearly noted. One also finds

mention of conditions, apparently grave, such as swollen and stiff thighs (*ūrustambha*), which are no longer seen.

4. A new application for textual epidemiology

It is obvious that the identification of infectious and non-infectious diseases such as malaria and epilepsy from among the many entities mentioned in the *Carakasāṃhitā* must be made on the basis of their clinical features described by Caraka. It is a fact of pathology that the clinical features hardly ever change over centuries except in so far as the virulence of the disease may fluctuate. A by-product of the present exercise in textual epidemiology is the proper identification of drug formulations which had been recommended for the treatment of contemporary diseases such as tuberculosis and diabetes. This information would facilitate the preparation of a short list of plants based on centuries of experience, whose compounds could be screened against target proteins in diseases – surely a better way to develop drugs from ancient medicinal plants than by screening thousands of plants blindly.

DOCTORS AS CHARACTERS IN SANSKRIT NARRATIVE LITERATURE

Charles Malamoud
Paris

The purpose of this meeting is to explore some aspects of Ayurveda.

Is Indian traditional medicine able to enrich and purify at the same time Western modern medicine? Is the conception of the relationship between man and nature that is implied in the principles and practice of Ayurveda just an object of curiosity for modern minds or can it inspire our thoughts and modify our behaviour? These are big questions which require specialists for a serious discussion. I cannot claim to be one of these specialists. It is not for a supposed expertise in the field of Indian medicine, nor in medicine in general, for that matter, that Ana Salema asked me to take part to this seminar. It is rather, I guess, because I spent the major part of my life studying society and literature of Ancient India, at least as it expresses itself in Sanskrit, that is the culture in which Ayurveda was born. Therefore, before real work starts, I intend to present a few marginal or preliminary remarks not on medicine but on physicians: that image of the physician that is conveyed by some literary texts and what we can learn of his status.

First, the social status of the physician. There is no perceptible difference in our texts between *vaidya*, *bhiṣak*, *cikitsaka*. Practically these terms are synonymous. Physicians, *vaidya*, *bhiṣak* and *cikitsaka* are not a specific *jāti*. In the *dharmaśāstra* and *dharmaśāstra* they are not related to a specific *varṇa*. But we cannot fail to notice that *dharmaśāstras* and *dharmaśāstra* refer to physicians only to include them in the lists of people from whom a *dvija* must not take food. In this respect, physicians are considered as impure and polluting, for instance in *Gautama dharmaśāstra* XVII 17, just as prostitutes (*pumścalā*) persons of ambiguous gender (*anapadeśya*), hunters who do not use arrows (*aniṣucārin*), policemen (*daṇḍika*), jailers (*bandhanika*), people who eat other people's leftovers

(*ucchiṣṭabhojin*.) and so on. We find similar lists, when the physician, *cikitsaka*, is associated with just as bad company, in *Āpastambadharmasūtra* I 6,18,21 in *Manusmṛti* IV 212, in *Yājñavalkyasmṛti* I 162. Moreover, *Manu* III 152 forbids *dvija*'s to invite physicians to take part to offerings to the gods or to meals included in the monthly ritual to the deceased ancestors. We can make all kind of hypothesis about the reason of these regulations. The fact is that neither the texts nor the commentaries give us any clue. We should not confuse these prohibitions, which are by and large of a religious character, with the popular satire, in the style of French Molière popular in India as well as in other countries and according to which physicians are the best servants and associates of Yama, the god of death, and are clever mostly in robbing the patients from all their riches. I shall give just one example of this literary genre from the anthology called *Subhāsitaśudhānidhi* attributed to Sāyaṇa.

A she-vulture asks her mate: "Strange, I have not seen smoke coming from the cremation ground for some time." No wonder, the vulture answers, the local physician has moved for another village." More generally this anthology includes a small section called *vaidyapaddhati* in which we find stanzas on what a good physician should be. What is the *vaidyasya vaidyatvam*? He is able to tell the true nature of an illness (he has *vyādhes tattvaparijñānam*) and he knows how to put an end to pain (*vedanāyāś ca nigrahaḥ*). But the physician is no master of life (*na vaidyaḥ prabhūr āyuṣaḥ*). Now this last sentence which seems to be a kind of proverb is quoted again in another stanza in the section called *asadvaidyapaddhati*. To take the patient's possessions and once he is dead, to run away: this is the *vaidyatva* of the *vaidya*. And again: *na vaidyaḥ prabhūr āyuṣaḥ*. So we have on one hand lists of qualities that characterise the way the physician should behave – and on the other hand harsh and bitter descriptions characterising the physician as greedy and coward, possessing just a knowledge he got from learning the *śāstra* and who is at a loss when he has to face a real case. A whole comedy (*prahasana*), the *Bhagavadajjukiya* by Bodhayana, is dedicated to the bringing into derision of a ridiculous physician. I repeat, this satirical turn is not specific to India, it is a part of what can be called ironically the wisdom of nations. However,

when one combines this attitude of bitter distrust with the ritual prohibitions in the *dharma* texts, one finds difficult to understand judgements such as Basham's in his book: *The wonder that was India*, p. 500: "The physician was a highly respected member of society and the *vaidyas* rank high in the caste hierarchy to this day ..." One is rather tempted to agree with what Louis Renou says in *La civilisation de l'Inde Ancienne* (p. 142): "Medicine had to defend itself against pretensions of wizards and fakes who, it seems, were a plague in the country and are probably partly responsible for the bad fame of the physicians: it is true that being in touch with all kind of people made them easily impure, and Manu excludes them from religious ceremonies." However, we can understand and accept Basham's sentences if we turn to literary narrative texts. Here we find physicians as real, individual characters, and the picture is quite different from what we have seen so far. But before I come to that, I would like to refer to *Rāmāyana*, II 83: here we have the description of the *prakṛti*'s, the subjects of the king of Ayodhya. They make a joyful crowd gathered to acclaim Rāma. The *vaidyas* are quoted in the enumeration of crafts, alongside with goldsmiths (*suvarṇakāra*), wollen cloth manufacturers (*kambalakāra*), servants of the bath (*snāpaka*), anointers (*ucchāḍaka*), performers and preparers of incense (*dhūpaka*) and even vendors of spirituous liquors (*śauṇḍika*). But generally in the narrative texts the physician appears as a high-ranking character, very close to the king, associated to the chief *mantrin*. True, the physician is described in the dramatic moments of failure rather than in moments of achievement: in spite the physician's efforts, dedication and wisdom, the king dies. So for instance in Kālidāsa's *Raghuvamśa* XIX 53; in spite of the *vaidyayatna*, the king cannot overcome the illness (*gada*) just as the flame of the lamp cannot resist the wind.

More tragic and moving is the story of the young physician Rasāyana in Bana's *Harṣacarita*, chap. V, p. 275 of the Chowkhamba edition, 1964: *Teṣām tu bhiṣajām madhye ...* The old king is sick. His son, Harṣa is desperate. He calls for help a group of experienced physicians. I quote from the translation by Cowell, pp. 143-144:

"Among their number, however, was a young doctor of Punarvasu's race named Rasāyana, a youth of about eighteen years of age, holding an hereditary position in the royal household, in which he had been cherished like a son by the king ; He had mastered the Ayur Veda in all its eight divisions, and, being naturally of an acute intellect, was perfectly familiar with the diagnosis of diseases. He now stood silent and tearful with downcast looks. Being appealed to by the prince, 'Friend Rasāyana, tell me the truth, if you see anything at all unpromising', he replied 'To-morrow at dawn, your highness, I will state the facts of the case. At dawn the prince descended ... Hearing from distracted young princes standing before him an indistinct murmur 'Rasāyana, Rasāyana,' he asked 'Well, friends, what of Rasāyana?' whereat they all at once became silent. Being further pressed, however, they with sorrowful reluctance explained 'Your highness, he has entered the fire.' The prince became (ashy) pale, as if scorched by an inner fire, and his grief-blinded heart, torn up by the roots, refused to be steadied.' A noble man, he thought, would rather not be than like an ordinary person utter unwelcome and distressing words. His generous nature, maintained in trying circumstances, has like unalloyed gold acquired a greater brilliance by entering fire."

The young physician throws himself in the fire without waiting the king's death because he is sure that the king is going to die. He expresses everybody's grief: " he just fell into the flames – we are burnt (*patitaḥ sa kevalam dahane / dagdhas tu vayam*)." The sense of honour and pride of the young physician is inseparable from his love to the king. It is explicitly said that he belongs to a lineage closely related to the royal family.

In a less dramatic setting, since we have an happy end, we see in the Śrī Harṣa's *Naiṣadhacarita* (IV, stanza 116), the king, Damayanti's father consulting his *mantripravara*, principal counsellor, and his physician (*agadamkāra*) on his daughter's sorrowful mood. Both of them give similar answers, but these answers can be understood in two different ways, by the

force of *śleṣa*: the office of both of them is to see that no evil disturbs Damayantī's inner apartment/inner body constitution (*kanyāntahpura*). Both of them spoke to the king with words that were alike (*tulyam ucatuḥ*):

"Oh king, listen, I know everything from reliable reports (*suśrutena*) and the statement of spies (*carakasyoktena*)," says the *mantrin*. "I know everything from Suśruta and the statements of Caraka", says the physician. "No expedient can suppress her heat ... except Nalada "the one given by Nala, – or the herb called *nalada*."

Now, whatever the status the physician receives from other people, it is important to understand how he perceives himself.

In both Caraka and Suśruta we find detailed instructions on the initiation of the medical student by his teacher. I refer to *Caraka* III 8, 13 and *Suśruta* I 2 ,3. It clearly appears that this *upanayana* is conceived of as a replica to the vedic initiation of the young *dvija* to the study of the Veda. It is explicitly stated that medical *upanayana* is meant primarily for *dvija*'s. *Śūdra*'s can be accepted as students if they have the required *guṇa* and if they come from a *kula* where it is a tradition to practice medicine. But in their case, the *upanayana* will be performed without recitation of mantras or the apprenticeship will start without *upanayana*.

Now it is well known that the student takes solemn oaths which have repeatedly been compared to Hippocrates' oath. In fact the student's promises are of two kinds.

- 1) As to his teacher. He promises to be loyal, obedient, totally devoted to his *guru* during the apprenticeship period.
- 2) As to the patients. The future physician promises to be totally devoted to his patients, to dedicate all his efforts to help them and to heal them. He promises not to do them any kind of harm. Here, a medical ethics is defined which cannot but attract our approval and admiration. Most precious for us today are the instructions about the discretion the physician has to observe: as soon as he enters a patient's house, he must not see or hear anything but what concerns the patient's illness, and he must not give any information

about the patient's condition to anyone outside. A translation of this passage of *Caraka* is given in Basham's book, p. 500:

"You must not betray your patients even at the cost of your own life ... When you go to the house of a patient you should direct your words, mind, intellect and senses nowhere but to your patient and his treatment; ... Nothing that happens in the house of the sick man must be told outside, nor must the patient's condition be told to anyone who might do harm by that knowledge to the patient or to another ... (*Carakasamhitā* III 8,7)."

But Basham's translation is not complete. It skips a few sentences to which I turn presently. We read: the physician should never give medicines to people hated by the king or to people who hate the king, nor to people hated by important men or to people important men hate (*na ca kadā cid rājadviṣṭānām rājadveṣinām vā mahājanadvīṣṭānām mahājanadveṣinām vāpy auśadham anuvīdhātavyam*).

Moreover, one should not give medicine to those who are affected by an excessively bad deformation, to those who have a criminal behaviour, those who want to die (*mumurṣu*). And the physician should not give medicine to women if their husband or the man who has authority on them is not present.

One can see that these are problems that are still very crucial to us, even if the solutions may appear disturbing.

It is the very difficult and very encompassing problem of the relationship between medicine and powers that be. It is the duty of the physician to take into account the king's, or the big men's interests in his therapeutical practice? Is he entitled to judgements on the physical, mental, moral quality of his patients? Must he defer to his patient's will when he says that he wants to die, or must he go on giving him medicines? Must he follow the common opinion according to which women are not independent persons by themselves and cannot be treated without agreement of the man to whom they belong?

Traditional Indian medicine is certainly quite different from Western modern medicine as far as therapy and conception of body and life are concerned. But in the domain of medical ethics – that is as to the question: what exactly is the physician's power – basic data are universal.

GARCIA DE ORTA AND HIS WORK IN THE FIELD OF DRUGS AND MEDICINAL PLANTS

K. Raghunathan
Faridabad

I propose to preface my presentation with the following tribute paid by Professor F. A. Fluckiger, the founder of modern pharmacognosy, to his pioneer Portuguese predecessor in 1884:

" ... above all the *Colloquies* are most remarkable for their wealth of information and for accuracy of their descriptions. Nobody before Garcia had described the drug plants of India with such care, or assembled such useful information about them. Whoever is concerned with history of Indian drugs must of necessity consult Garcia de Orta; despite all errors, which are mainly due to the period in which he wrote, the *Colloquies* must hold a honourable place in the history of Pharmacognosy."¹

The earlier period of Garcia de Orta will be rapidly covered and the period of his stay in India will be later taken up. Study of Garcia de Orta is not just study of Botany or Medicine but a wide range of areas like historico-geographical profile, nomenclatural anecdotes relating to certain places and drugs. A few are cited to have a glimpse of the erudition of this pioneer. He was a pioneer in more ways than one – an earliest European to provide vivid description of cholera, the first to mention the drug which we can now recognize as a *Rauwolfia* (named after Leonhard Rauwolf, 1540-1596), the first to write a book on Indian drugs, printed at Goa in 1563 in the first printing press in Asia. There could be endless firsts to his credit. These and other matters and few of these will be highlighted in course of talk.

¹ Boxer, C. R., *Two Pioneers of Tropical Medicine: Garcia d'Orta and Nicolás Monardes*. London, Wellcome Historical Medical Library, 1963, p. 28.

Garcia de Orta was the earliest European physician who practiced in India for about 36 years from 1534. He was born at Castelo de Vide, a small town in Alentejo probably in 1501. His parents were Spanish Jews, father Fernão de Orta from Valencia de Alcantara and his mother from Albuquerque. He was their first child. He was sent to Spanish Universities of Salamanca and Alcalá de Henares to study Arts, Philosophy and Medicine in 1515; he returned to Portugal after obtaining the medical degree. The study included memorizing texts chiefly those of Hippocrates, Galen and Avicenna besides a certain amount of practical work. In accordance with the accepted Graeco-Roman ideas, humoral pathology was then and for long afterwards the basis of a medical education. Disease was considered as an imbalance or an impurity of one of the four cardinal bodily humours: blood, phlegm, choler ("red" or "yellow" bile) and melancholy (black bile). Treatment aimed at readjusting the balance, predominantly by the use of enemas, purging and bleeding but also by the employment of stimulants, tonics and drugs compounded from medicinal herbs and plants.² He took qualifying examination organised by *físico-mor* in 1526, which was compulsory for those who studied medicine outside Portugal and wanted to practice in that country. After a spell of short period of practice in his native place, he moved to Lisbon in 1526. The reason for this could be that the population hardly exceeded 5000 with no scope for any brilliant career. It could perhaps be even the anti Jewish feeling prevailing in Alentejo in these days. He progressed professionally and with some influence secured a university chair. On 12th March 1534 de Orta sailed for Goa in the fleet commanded by his friend and patron, Martim Afonso de Sousa, Captain-Major of the Indian Ocean (1534-38), as his personal physician. De Orta accompanied Martim Afonso de Sousa in several campaigns on the West Coast of India between Kathiawar Peninsula and Ceylon.

Colloquies on the Simples and Drugs of India of Garcia de Orta printed from Goa in 1563 were chronologically the first printed publication on Indian plants and practice of medicine in the tropics. This treatise, which

² Idem, p. 7.

is almost encyclopaedic in range, was cast in the form of dialogues, between the interlocutor (Dr. Ruano) and himself. The scientific curiosity, which de Orta ascribes to his interlocutor, is itself the preamble of the work as it reads in the first of the colloquies:

"I have a great desire to know about the medicinal drugs such as are called the drugs of pharmacy in Portugal and these other remedies and simples which there are here, as well as all the fruits and pepper [species]. I would like to learn their names in all the different languages, as also the countries where they grow, and the trees or plants, which bear them, and likewise how the Indian physicians use them. Furthermore, I would like to know about some of the other plants and fruits of this land, even if they are not medicinal, and also some of the customs of this country and the things that happen therein."³

The treatise contains 57 colloquies, each dealing with one plant drug. Non-botanical topics like diamond, ivory, bezoar stone, etc., are also included. The subject matter in the *Colloquies* falls into three categories namely:

1. Those connected with *materia medica* and botany of the east
2. Those dealing with medicine in general
3. Those related to historical, geographical and other kindred topics

At times there is sprinkling of anecdotes and personal views and observations in case of some drugs.

The *Colloquies* by and large followed alphabetical order but some considered it was abandoned after *galanga* followed by *cravo*. Ruano, in place of correct Latin name for cloves, i.e., *caryophyllus*, used the name *gariofilo*, a vulgar Latin presentation for cloves using "g" in place of "c". The alphabetical order was broken by a mistake by Ruano; subsequent to

³ Idem, *ibidem*, p. 8.

this the alphabetical order was followed till zedoary. So far as the contents are concerned, the drug names in different languages known to him, general appearance of the plant/drug material followed by discussion on aspects like habitat, commercial routes by which the material reached, the part or parts used and therapeutic uses were presented. There are some descriptions of some diseases.

In Goa, de Orta encountered much for which he had not been prepared by his classical university education. He met with new diseases such as *morxi* (later thought to have been cholera), which de Orta thought more deadly than plague, as well as more familiar ones such as fever, which seemed to behave differently in the tropics.⁴ Garcia de Orta provided the most vivid description of this condition.⁵ He explained it is called *colerica passio*, the Indians call it *morxi* and the Arabs call it *hachaiza*. It is more acute here than in our country. The pulse is very low and can scarcely be felt. The patient feels very cold, with some cold sweat, complains of great heat and a burning thirst, the eyes are much sunken, he vomits much but is so weak that he is unable to discharge anything; he does not sleep and has cramps in the legs. He prescribed – chafing dishes and hot poultices, cauterise the feet with warm iron, administer emetic and purgative clysters. Treatment must be in conformity with symptoms. He indicated that local people give rice water with pepper and cuminseed, what they call *canje*. The feet are cauterised as ordered earlier. For cramps, they fasten up head, arms and legs with very strong bands down to the knees.

De Orta indicated *pau-de-cobra* and bezoar stone as useful remedies. He said he treated the Bishop of Malacca⁶ with this.

⁴ Harrison, M., "Medicine and Orientalism : Perspective on Europe's Encounter with Indian Medical Systems" in *Health, Medicine and Empire-Perspectives on Colonial India*. Biswamoy Pati and Mark Harrison (ed.). New Delhi, Orient Longman Limited, 2001, pp. 43-44.

⁵ Garcia de Orta, *Colloquies on the Simples and Drugs of India*. Sir Clements Markham (Int., Transl. and Index). London, Henry Sotheran and Co., 1913, p.155.

⁶ Jaggi, O. P., *Medicine in India: Modern Period in History of Science, Philosophy and Culture in Indian Civilisation*. Volume IX, Part I. D. P. Chattopadhyaya (ed.). New Delhi, Oxford University Press, 2000, p. 108.

There is a parallel in the description and treatment of this condition in Ayurveda. In ayurvedic treatises, this condition is known as *viśūcikā*, the patient experiences a variety of pains as though the whole body is being pricked. That is why the name is *viśūci*. The complications of this condition are pain, giddiness, abdominal distention, dryness of face, if *vāta* is main *doṣa*; if *pitta*, fever, diarrhoea, excess of thirst, comatose condition and if *kapha*, vomiting, heaviness of body, salivation, cough, etc. Ayurveda advocates cauterisation over the heels and planned dietetic schedule.⁷

Dysentery is another condition, which when it becomes chronic (i. e. chronic dysentery), is very difficult to cure. *Marmelo-de-bengala* (collo. 58) is good for dysentery. It is available in plenty in mainland and some in the island of their stay. It is known as *cirifoles* and *belas*. The local name is *beli* and in pharmacy and in their writing. The leaves are like those of peach tree and with the same scent. The leaves are tender and the colour is dark green; the bark thins at first and afterwards it becomes thicker. It is dried when the fruit is ripe, because then it becomes as hard as a coconut. At first is the size of a small orange, but it increases till it reaches the size of a large quince. They draw out the inside, which is very tough when ripe and cutting it into large slices make into a conserve with sugar. When younger they eat it in *achar* or salted. To this description of *marmelo-de-bengala*, Dimas Bosque added the therapeutic application in dysentery. Plasters are made and applied over belly and stomach.

Garcia de Orta (collo. 20) described the effects of *datura* when taken internally: the individuals loose their heads and they always laugh and are very liberal, for they let people take such of their jewels as they choose, and only laugh or speak very little, and that not to the purpose. So that a robber has only to give this medicine in the food and the effect lasts for twenty-four hours. De Orta, by way of treatment, prescribed rubbing legs very hard and continuously with some coir and apply a clyster, also administering an emetic. If the person is not better after two hours, he/she must be bled.

⁷ Vāgbhaṭa, *Aṣṭāṅga Hṛdaya*, Sū, 8.17. Bombay, Nirnaya Sagar Press, 1939.

His interlocutor, Ruano suggested to de Orta to give *datūra* to one of the servants and de Orta told it is against conscience to do such a thing. He provided taxonomical description to Ruano when he desired to see the herb. It is a tall plant with leaves, the shape of *branca-ursina*. The leaves are not very large and pointed at the end, making a prick like a lance, and around the leaf there are similar points. The leaf is set on a thick stalk and has many nerves spread over its surface. The flower, which comes from the branches, is like the rosemary in colour. They are rounder and not so much the shape of a cube. They use this flower much, or the seed which is enclosed in it. The taste of the leaves and stalk is rather insipid with much humidity and a little bitter. The smell is like radish, but not so strong. Whence it is to be thought vaporous, with some poisonous qualities.

In Ayurveda, this is used in the treatment of *tamaka śvāsa*, what in modern medicine is called as bronchial asthma. It is used in the treatment of *sandhigata vāta*, an affection of joints.

There is a drug by name *sarpagandha*, also called *sarpasugandha* [*Rauwolfia serpentina*], which is called by lately '*pagal ki jadi*'. This is used in mental disorders. Garcia indicated this drug *pau-de-cobra* (collo. 42) is useful in the treatment of poison from serpents or cobras and tried for rheumatism, smallpox, measles and cholera, which is called *mordexi*. It was also said to be useful in the treatment of fevers. The drug was administered in an ounce of water and it causes vomiting with much bile. To a query about how he knows it, he explains the presence of snakes in Ceylon [now Sri Lanka]. God has given *pau-de-cobra* against snake bites. It is found to be good against snakebites because in that island there are small beasts like ferrets, which are called as *quil*, also called as *quirpele*. They often fight with these serpents. When one of them knows that it must fight with them, or fears that it may be so, it bites off a piece of root and rubs it or rather anoints with its paws which are wet with juice. It puts this on the head and body and parts where he knows that the cobra will bite when it springs. It fights with cobra, biting and scratching till it is dead. If it has not succeeded, *quil* rubs itself against the root and comes for combat. He narrates what Franciscan Friar told about demonstration fight between cobra and mongoose generally alluded to by the yogis. Ruano wanted to

know whether the stick is found elsewhere other than Ceylon. De Orta proceeded to provide botanical description:

"Of this stick there are three kinds in Ceylon. The most esteemed kind, is called in Ceylon (the land of the Chingalas) *rannetul*, a bush rising to two or three *palmos*. It gives out few branches, only four or five, and those very slender. The root is the profitable part, and that also is very slender, finer than the finest of our vine roots, and some root of this stick is always above ground. If it is broken off or bitten off at any part, presently other roots spring out where the place is that was broken. The fruit of this stick is like the elder, only vermilion and harder. It grows in round clusters, like honeysuckle, the vermilion grains being smaller and more open. The flower is a very deep vermilion and apart from the leaf, which is like that of a peach tree, the green colour being deeper. The colour of the root is between white and gray, and is very smooth to the touch, and very bitter. This stick is found in many parts, both in Goa and on the mainland. It is drunk in water, being first well mashed. It is also given in wine or in some cordial water. It is also ground like sandal. It is called *boqueti avale* in Cingalese. In Ceylon there is another stick or root used as an antidote. The tree is like a pomegranate and not larger, and the leaves yellow and very beautiful. The whole stem is thorny. The bark is white and thick, cracked, very smooth, and bitter, but not so much so as the first. The stick and the root and the bark are what are given, all mixed, but they say the root is the best. This tree grows like a pomegranate, and is with the other trees of the forest that are neighbours to it, but leans to them in the same way as a gourd, and so the highest branches embrace the rest".⁸

⁸ Garcia de Orta, *Colloquies on the Simples and Drugs of India*. Sir Clements Markham (Int., Index and Translation). London, Henry Sotheran and Co., 1913, p. 160.

Cups were ordered to be made from this tree for the sick, when they had been touched with poison and it did them good. These cups also serve to make a posset of treacle as some of the doctors prescribe to prevent a poison from doing harm. The drug is widely used in the treatment of hypertension and in many other clinical conditions.

The root-of-china (collo. 47) is botanically known as *Smilax china*. Garcia de Orta said as all these lands and China and Japan have *morbo napolitano*, it pleased a merciful God to provide the root as a remedy with which good doctors can cure it. Garcia reached India with five quintals of *guaiaco* and he administered it in cases of sores of the *sarna casellana*. An honourable and rich man of Diu told Martim Afonso de Sousa, who was there taking possession of the fortress which Sultan Bahadur, the King of Cambay, had ceded to him, how he had been cured by the root-of-china, which restored him to complete health, not requiring any special diet except that he was not to eat beef, pork, fish or green fruit. In China fish is conceded, because they are great eaters of it. As this became well known, people had a strong desire to have this root. For all men are inclined to eat and drink, and much more in this land owing to their laziness. Then they began to take the *guaiaco* as part of their diet, as they did in Spain, so that when the ships of Malacca came, a small quantity of the root was valued at 10 *cruzados* the *ganta* * (which is a weight of 24 oz.). In subsequent years it was cheaper, valued at 30 *réis* the *ganta*. The drug is administered considering the quality and character of the patient, then to the nature of the illness, the season, the country, the heat, the cold, the sex and age of the person who takes it. These principles of drug administration are reminiscent of what Ayurveda says.

Regarding the administration of the drug, de Orta described as hereafter:

"If the illness is very bad they took an ounce of this root in 4 *canadas** of water and use half the water. The rest is kept in a glass or glazed jar. They take off the froth at the boiling, because it

* The *ganta* is usually a measure of capacity (1,4 litres) [editor's note].

is good to put on any sores; sometimes we put it on swellings when it is being boiled, and it is very good for allaying pain. At other times fomentations were carried out with this water on swellings. The Chinese are accustomed to give larger doses of the root in their country, and some people here wanted to imitate the Chinese, cooking 2 oz. or 1 ½ oz. of the root, but it was found to do harm, for it is very heating".⁹

He cites his personal experience of taking the root with sudorifics and hot water for sciatica; it caused erysipelas and pains from the great heat engendered in liver. So bleeding had to be carried out and barley water administered. The people on treatment with this drug refrained from hot water and such a quantity of the root as they give in China, for that land is very cold while this is hot. Only in taking it here, when a sudorific is needed, apply heat in the morning, and something to cause perspiration morning and evening. If the weather is very hot, the root is not given, but more soporifics.

The drug is to be suitably rectified before administration. De Orta says he can take credit of being the first who used after due rectification in a patient covered with swellings on the head and other parts and discharging matter. He was treated well, and afterwards many others were treated successfully. But now no one takes the root without being first rectified with some other medicine.

De Orta provided the line of treatment in cases where root-of-china is used. The general rule is to give syrup and purge the patients before they take it, and if the case is very bad the syrup must be made soluble. If there is inflammation, turpeth is added and the syrups are to be watered with water of the root. After purging, the rule is to begin to administer the root, and after 15 days if it is necessary, another slight purgative, and sometimes another after 30 days. If in that time, it does not cause looseness, it is crystalised everyday with water of the root, honey in rosewater, oil and *canafistula* according to the necessity of the patient. If the patient is very

⁹ Idem, p. 156.

feverish, the root is given up and he is given other treatment more suitable to the case. At times the root does good in 20 days, and at others it takes a longer time, but usually pain increases for 15 days and from that time it goes down. He narrated his experiences. He suggested the dose is to be increased in Portugal since it is a cold place compared to this country. Chicken cooked in the water of the root or bread is to be given in diet. Wine is always forbidden except when the root is given to treat weakness of the stomach, for in that case the root with wine does much good, for it takes away the loathing and ensures good digestion. Salt may be moderately used. The Chinese use bread with honey. Root cooked with meat also is taken in China. Later, he explains various conditions wherein this root is given – in infirmity, paralysis, shivering fits, arthritis, edema (a condition where scale like wax formed on the skin), sciatica, gout, scrofula, indigestion, swellings produced by melancholy or by white tumors, old hurts, stone and ulcers of the bladder and at times the stone is got out which never could be removed before.

This is a shrub, three to four palms (a palm is 0.22 meters), above the ground. It has a thick root and another thin comes from the other end. When the root is taken up it is very tender, and it is eaten in mouthfuls, raw or cooked. From the root, there come out small fibers the size of writing pens and as the root grows the fibers shoot out, and from these shoots grow some leaves with the shape of young orange leaves. This shrub is called *lampatam* by the Chinese. These are to be protected by putting in Martaban jars. The root will not be damaged inside of martaban since it is glazed inside.

This drug is known by the name *chopchini* in India indicating its source of origin. This drug is not found in ayurvedic works of before 15th century. It was Bhāvamiśra, who provided first description of the disease and drug. He has called the drug as *phirange* bark for treatment of *phiranga roga*. *Phiranga* is a term used for Europeans.

Garcia de Orta's classic inquiry into Asian botany and medicine was neglected by his fellow Portuguese, but not by other Europeans. Europe was eager for information about newly explored regions of the globe and thus it fell to the lot of accomplished Flemish latinist, Charles de

l'Escluse to introduce to the learned world of Northern Europe many of the new found products both of America and of India. He published a *précis* of Garcia de Orta's work in his *Aromatum [. . .] Historia* in 1567, and this was the basic of Italian and French versions. Not until 1891-1895 did a satisfactory edition of the original work – that of Count Ficalho – appear, and only in 1913 a complete English translation from Sir Clements Markham.

Cristovão da Costa, of Portuguese descent, though born in Africa, practiced for sometime as a surgeon in Portuguese India. He was also at Cochin on Malabar Coast, when he became acquainted with de Orta's work. In 1578, he published in Spanish *Tractado de las drogas y medicinas de las Indias Orientales*, which is largely made up of extracts from de Orta. This was translated into Latin by Clusius and into English by his friend James Garrat, a London apothecary who is described by Gerard as "curious searcher of simples".

Garcia de Orta's work holds a special place in botanical history, because it is cast in the form of dialogue in which Orta, to a certain extent, typifies the "Arabist" who accepts the teaching of classical writers, not simply as they stand, but as corrected and amplified by Avicenna and the mediaeval Arab physicians, his interlocutor, on the other hand, tends towards the opinion of "Hellenists" who discard the experience of all intermediate generations and regard Greeks as the sole authorities. De Orta, having established himself in a country so far from Spain, was unusually free to express his own opinions. He said, in collo. 32 "if I were in Spain, I would not dare say anything against Galen or against the Greeks".

De Orta quoted Avicenna and Dioscorides whose works are available in Latin from 12th century and has been rendered into Portuguese just before the time of Garcia de Orta. De Orta once quoted the *Carakasamhitā* but the second time Caraka's name is written Xarach. He mentioned him in his dialogue on mirabolans (collo. 37); he says Serapiam mentioned Xarach (Caraka) saying the myrabolans are warm. The *Colloquies* gave an early glimpse of a number of oriental products, such as cloves, mace and nutmeg, ginger, cinnamon, asafoetida and betel nut. Simples cited by Garcia de Orta include *Aegle marmelos*, the *nirgundis*

(*Vitex negundo*), *Melia azedarach*, and *harsinger* (*Nyctanthes arbor-tristis* and *Holarrhena antidysenterica*).

In de Orta's work da Costa has shown two plants of *Vitex negundo*, one shown as male and the other as female. In *Pharmacographica Indica*, William Dymock *et al.*,¹⁰ under *Vitex trifolia*, two varieties are mentioned, one with pale blue flowers (*sitapuşpa*) and the other with blue flowers (*puşpanilika*). Among the Tamils, one of these plants is supposed to be male and the other female and for this reason they usually combine together in their prescriptions. In Ayurveda, this is highly praised drug in the treatment of joint disorders, fevers, etc.

Da Costa's depiction of *Piper betle* shows the observation of de Orta regarding keeping a right thumbnail long and sharp to facilitate removal of midrib. While referring to *árvore-triste* (collo. 6) de Orta told a legend about that. This tree was the daughter of a great Lord named Parizatako. She became enamoured of the Sun, who abandoned her after their intercourse and she killed herself and was burnt (as is the custom in the country). From her ashes grew this tree, the flowers of which abhor the sun and do not appear in its presence.

He provided a brief description of a plant with sensitive leaves – *Biophytum sensitivum* – and also sleep position of the leaves of tamarind. Aloe had been well described right from the place, it is procured, its different names and its use as a purgative. Aloe is not mentioned in the earlier treatises *Bṛhatrayis* of Ayurveda, all references are after 10th century. First reference is in *Rasarnava*. De Orta mentioned bezoar stone, also called snake stone, which is useful in treating effects of venomous snakes. It is called *pād-zahr* in Persian meaning antidote to poison.

A few interesting points related to origin of names and other miscellaneous matters are presented below:

The Bishop Dom Ambrósio came to this land by Arabia and Turkey, moved by zeal for our faith. He knew Arabic well. He told that Abraham, when God called him from Ur, a city of the Chaldees, went to Aleppo, the chief city of Syria, and took great number of cattle. He gave

¹⁰ Udawadia, F. E., *Man and Medicine. A History*. New Delhi, Oxford University Press, 2000, p. 360.

milk for all necessitous and poor to drink and they came for it everyday. These poor people when they came asked for Yalep, which means a question: "order where shall we eat now". This was the reason why that name Aleppo was given to the land. The tradition is that it was inhabited by Abraham.

He told a legend in the life of São Silvestre where it is found to have been written that when Constantine, leaving Rome to the Pope, went to Constantinople, he granted to it the privilege of being called Rome and that the country should be called Romeos.

The city of Cairo also has an interesting tale told by de Orta. Cairo was a famous and ancient city. It was called Memphis by the Greeks in ancient times; where there are now famous pyramids and where Jose was a captive. Because a queen named Alcaire increased the size of that city in one direction, the whole city got the name of Cairo.

As I have earlier indicated de Orta's work is a treasure trove of encyclopaedic dimension. It was around 1934 that Lt. Cdr. Louis Roddis of United States Navy published an article on Garcia de Orta. He mentioned he was the first European writer on tropical medicine and a pioneer in Pharmacognosy. He concluded his article with the following appeal, which is even today relevant since no step in that direction was taken up. Garcia de Orta is a full subject for one full seminar. Incidentally, I may indicate such a seminar has to include Nicolás Monardes since what de Orta is for the east, he is for the west, particularly American plant and herb study.

"March 10, 1934, will be just four hundred years from the day on which de Orta set sail for India. It would be well if this date could be commemorated in some suitable manner by societies throughout the world concerned with the study and advancement of tropical medicine, pharmacy and botany. The issue of special editions of their official publications, or of articles and editorials on de Orta, his time and his work, would well fit the occasion and

bring to members of the professions of medicine and pharmacy the memory of a pioneer in both fields."¹¹

¹¹ Boxer, C. R., *Two Pioneers of Tropical Medicine: Garcia d'Orta and Nicolás Monardes*. London, Wellcome Historical Medical Library, 1963, p. 5.

***CANNABIS* IN TRADITIONAL INDIAN HERBAL MEDICINE**

Dominik Wujastyk

Wellcome Centre for the History of Medicine at UCL
London

Introduction

To discuss *cannabis* is to step into an arena of fierce and lively contest. The narcotic properties of *cannabis*, as well as the legal controls over it which are in place in most first-world countries, and in the parts of the developing world influenced by these countries through various contemporary and historical hegemonies, place *cannabis* at the cross-roads of debates about sin, corruption, medicine, health, pain, insanity, spiritual transcendence, the generation gap, and, naturally, money.

As I began reading material about the historical role of *cannabis* in South Asia, I rapidly became aware that few pieces of writing on this topic were produced without an underlying agenda of one sort or another. Writings on *cannabis* appeared throughout the last century, and reached a new intensity in the sixties and seventies, as an integral component of the Western cultural revolution. President Clinton became famous for holding his breath at Oxford, of course. The flood of *cannabis* publications has not abated, and the debate about the proper place of *cannabis* in Western societies is only growing more tumultuous. There is a *cannabis* article in the national press almost every day at present, commonly reporting on one or other politician who has called for decriminalisation of the plant. And at least in the UK, the law itself is having to find appropriate responses to the sea-changes that are taking place in public opinion. Only last September, Lezly Gibson, a multiple-sclerosis sufferer, was accused of possessing eight grams of *cannabis*. The jury took only an hour to acquit her, in spite of the fact that Mrs Gibson explained to the court that for the last twelve years she had been smoking up to five joints of *cannabis* daily for the relief of her

MS symptoms. And in November, Rasta Brown, charged with possessing *cannabis* with intent to supply, applied to have his case reconsidered under article 9 of the Human Rights Act, the right to freedom of thought, conscience and religion. Mr Brown's lawyer argued that in the Rastafarian religion, *cannabis* was considered not only an aid to worship, and a medicine, but crucially, also as a source of income. In January, Rasta Brown was sentenced to 150 hours of community service for possession of herbal *cannabis* with intent to supply, after a judge expressed "respect for the sincerity of his beliefs". Judge Charles Gibson admitted that he was passing a lenient sentence. Both of these cases share many critical features with the landmark Robert Randall case which took place in Washington D.C. in 1978. Following prosecution for growing marijuana plants, the legal settlement guaranteed Randall legal, medically-supervised access to medicinal quality marijuana, which is supplied by the government (Randall 1997).

A fascination with *cannabis* is by no means new. In the Paris of the mid-nineteenth century, a fashion for *cannabis* flourished around Jacques-Joseph Moreau de Tours who conducted serious medical studies, as well as leading a more experimental and practically oriented "Club des Haschischins" (Moreau de Tours 1845). Both Charles Baudelaire (1860) and Théophile Gautier (1846) wrote on the *cannabis* experience, perhaps influenced by Humphrey Davey's 1839 account of the inhalation of nitrous oxide, all of them early exemplars of a literary tradition of writing about the drug experience that includes Jean Cocteau's (1889-1963) striking account of opium use, as well as the notable accounts of Aldous Huxley and Richard Charles Zaehner.

America too experienced a nineteenth-century cultural awakening concerning *cannabis*. The American poet Bayard Taylor wrote on the hashish experience at about the same time as Baudelaire. And Fitz Hugh Ludlow took the literary world by storm with his *The Hasheesh eater: being passages from the life of a Pythagorean* (1857) (Ott 1993: 387 f.). And with the birth of blues and jazz and the development of the American music industry, *cannabis* gained a new circle of users amongst the hard-pressed, often poor, hungry, and overworked musicians, who were called upon to

produce flights of creative and energetic music night after night. Both Louis Armstrong and Fats Waller were pursued at different times for *cannabis* possession. In 1930, Satchmo was even arrested for pot possession, and commented famously on the toughening drug laws that, "At first you was a misdemeanour. But as the years rolled by you lost your 'milde' and got meaner and meaner" (Sherman *et al.* 1999: 63).

1. Earlier history

The general contour of the received history of *cannabis* is that the plant in its medicinal or narcotic use played almost no role in European or American culture before about 1800, its medicinal and recreational uses being better known in other parts of the world (Aldrich 1997). This may well be because the psycho-active constituents of the plant were not naturally present in the variants grown outside the tropics. Recent histories of *cannabis* firmly enlist pre-modern India as a shining example of a culture in which medicinal and psycho-active uses of *cannabis* were widespread and fully integrated not only into recreational and sexual life, but also into religious practice. The nineteenth century saw Europe and America waking up to the medical and social possibilities of *cannabis*, and its growing role as a stimulant and narcotic alongside coffee and tobacco. But the twentieth century marked a sharp and to some extent irrational reaction to *cannabis*, with its demonization being completed after the Second World War.

While it may be the case that there are few European voices before 1800 saying anything important about *cannabis*, one such voice also happens to be one of the loudest and coarsest voices on any topic. In *Gargantua and Pantagruel*, François Rabelais (1490-1553) gave a characteristically rambling and florid account of the herb, which he nicknamed Pantagruelion (Rabelais 1955: iii.49-52). He ended book three of *Gargantua and Pantagruel*

Arabians, Indians, and Sabacans,
Cease your praise, sing no more pacans,
To incense, myrrh, or ebony.

Come here, a nobler plant to see,
We'll give you seed to take away;
And if it grow with you, then say
A million prayers of thanks to heaven;
And swear the realm of France, that's given,
The sacred Pantagruelion's
The happiest beneath the sun. Rabelais (1955: 432)

It is characteristically mischievous of Rabelais to hold up hemp as a possible French gift to Asia. Rabelais knows some medicinal properties of Pantagruelion, for example that it "softens hard sinews, contracted joints, sclerotic gout, and gouty swellings. If you want quickly to heal a scald or burn, apply some Pantagruelion raw. . . ." (Rabelais 1955: 427). But, in typically bombastic and over-extravagant form, it is chiefly as the source of rope that he praises the plant, claiming for it a leading role in business, trade, transport, and all aspects of private and public life. As was noted, the *cannabis* plant grown outside Asia did not have strong narcotic qualities, and surely of all people, Rabelais would have celebrated these properties had he known of them.

2. Garcia de Orta

In fact, the narcotic properties of *cannabis* were first brought clearly to the attention of European physicians a few years after Rabelais's death (1553) through Garcia de Orta's 1563 publication of the landmark work, *Colloquies on the simples and drugs of India* (de Orta 1563, 1987). De Orta was descended from a family of Spanish Jews, which was expelled to Portugal in 1492. His father was forcibly baptised five years later. Garcia himself was teaching at the University of Lisbon by the 1530s. In 1534 he sailed to India, fleeing the impending Inquisition. He established a successful practice in Goa, on the West Coast of India, south of Bombay, in an island of which he owned the lease. De Orta became a personal friend as well as physician of the Sultan Burhān Nizām Shāh of Ahmednagar. In 1560, the Inquisition reached Goa, but de Orta was not persecuted.

However, after his death the church authorities became aware of his family's Jewish heritage, and his remains were exhumed and burnt in an *autodafé* in December 1580.

De Orta's work was written in Portuguese, and was most often read through the Latin adaptation made by Clusius (1526-1609) not long after the publication of the original (Clusius 1567). Clusius's book went through five editions in his own lifetime. The publication of the *Colloquies* marked a turning point in the history of the European understanding of the natural world for several reasons. Most obviously, it opened the eyes of sixteenth-century European readers to a whole world of natural products and medical traditions which was completely new to them. Equally important was the fact that de Orta had sufficient intellectual courage, coupled with respect for first-hand observation, to contradict the great classical authorities on herbal medicine (Boxer 1963: 14). "Do not try to frighten me with Dioscorides or Galen," says de Orta, "because I merely speak the truth and say what I know" (de Orta 1987: 60). European readers thrilled to the colourfulness and independent thinking of de Orta's writing, and his work was hugely influential, being, for example, a major source for both Bontius and Linnaeus (Boxer 1963: 28).

De Orta's eighth colloquy is dedicated to *bangue*, his spelling of the Sanskrit word *bhaṅgā*. He begins with an enquiry about the difference between *cannabis* and opium. De Orta's colloquies are written, often with humour, as working dialogues between de Orta himself and a stupid sidekick called Ruano. In the chapter on *cannabis*, he begins by having his stooge ask de Orta what he means when he curses his servants, shouting "bangue" or "opium" at them. Does de Orta really mean there is a distinction between these two drugs, and if so, what is it? De Orta tells Ruano that *bangue* is different from opium, and describes how Indians use the seeds or pounded leaves "to quiet the women" (de Orta 1987: 54). (At least de Orta is evenhanded in his sexism; later he describes how Indian women use opium to make their lovers perform more slowly and satisfyingly (de Orta 1987: 331-32).) De Orta goes on to explain how spicy drinks are made with *cannabis* as an ingredient, and he notes the effects as follows (de Orta 1987: 55-6):

The profit from its use is for the man to be beside himself, and to be raised above all cares and anxieties, and it makes some break into a foolish laugh. I hear that many women take it when they want to dally and flirt with men. . . . The great Sultan Bahadur said to Martim Afonso de Souza, to whom he wished every good thing and to whom he told his secrets, that when at night he wanted to go to Portugal, Brazil, Turkey, Arabia, or Persia, he only had to take a little Bhangue. This was made up into an electuary with sugar and spices and was called Maju.

. . . Those of my servants who took it, unknown to me, said that it made them so as not to feel work, to be very happy, and to have a craving for food. I believe it is so generally used by such a number of people that there is no mystery about it. . . . I have not tried it. . . . [But] many Portuguese have told me that they have taken it and that they experienced the same symptoms, more especially the female partakers. However, it is not one of our medicines and we had better not waste any more time over it.

In the middle of the seventeenth century, then, on the west coast of India, *cannabis* was "generally used" for recreational and aphrodisiac purposes and was not thought extraordinary by local people. If Garcia de Orta stands at the cusp of a major transition in the European understanding of Asian herbal medicine, so does another figure, William O'Shaughnessy (1809-1902), who was even more important as a pivotal figure in the understanding specifically of *cannabis*.

3. William O'Shaughnessy (1809-1902)

By any measure, Sir William O'Shaughnessy was an extraordinary man. Born in Limerick in 1809, he graduated M. D. from the Edinburgh medical school in 1829. Shortly after graduation, at the age of 22, O'Shaughnessy invented the technique of intravenous fluid and electrolyte replacement therapy for critically dehydrated cholera patients. In the early

1830s, O'Shaughnessy lectured on forensic medicine and published important works on chemistry, toxicology, and the pathology of cholera in Britain, and also on the use of iodine for the treatment of scrofulous diseases. In 1833 he joined the East India Company's service as an assistant surgeon and departed for Calcutta. In this, he was joining the early nineteenth-century "brain drain" to India of highly able people who were unable to find in Britain the professional preferment they felt they deserved. Within two years, O'Shaughnessy's abilities were recognised by his appointment as professor of chemistry at the Medical College of Calcutta. His deep interest in *materia medica*, including the traditional remedies of India, led him to publish the influential *Bengal dispensatory and pharmacopoeia* in 1841 (O'Shaughnessy 1841). This work was the progenitor of all subsequent volumes of the *Pharmacopoeia Indica*, and both directly and indirectly O'Shaughnessy's *Dispensatory* exerted a defining influence over the British practice of medicine and drug prescription in India for almost a century. In 1843, O'Shaughnessy was elected Fellow of the Royal Society.

Later, O'Shaughnessy changed profession, and in 1855, as Director of Telegraphs for India, he brought telegraphic communications to India, a service for which he was knighted in 1856 by Queen Victoria. He returned to England in 1860, and retired from imperial service in 1861, at the age of fifty-two. In the same year, he inexplicably changed his name to William O'Shaughnessy Brooke. He was married three times, and died in 1889, at the grand age of eighty-one (Mikuriya 1973; Gorman 1984-1985; Ghose 1994; Bridge 1998; for further biographical references, see Gorman 1983: 115, n. 4.).

In 1839, at the height of his work on *materia medica* in India and holding the position of professor of chemistry and natural philosophy at the Medical College of Calcutta, O'Shaughnessy published a book entitled *On the preparations of the Indian hemp, or gunjah (Cannabis Indica), their effects on the animal system in health, and their utility in the treatment of tetanus and other convulsive disorders*. O'Shaughnessy's research was to stimulate an explosion of interest in Britain and elsewhere in the medical use of *cannabis*.

O'Shaughnessy began his study with a competent and wide-ranging survey of the previous information available on *cannabis* in Europe and Asia.

He noted that Western Europe was almost completely ignorant of the medical uses of *cannabis*, and only faintly aware of its stimulant properties.¹ In contrast, *cannabis* was known to Sanskrit, Persian and Arabic writers from much earlier periods.

O'Shaughnessy's account is full of lively anecdote and observation. Allow your imagination, for a moment, to follow O'Shaughnessy's description of the collection of *cannabis* resin during the hot season in central India and Nepal (1839a: 6):

Men clad in leathern dresses run through the hemp-fields, brushing through the plant with all possible violence; the soft resin adheres to the leather, is subsequently scraped off, and kneaded into balls, which sell from five to six rupees the seer [ca. 2lbs]. . . . In Nipal, Dr. McKinnon informs me, the leathern attire is dispensed with, and the resin is gathered on the skins of naked coolies.

What a startling spectacle this might have presented to an unsuspecting hill-walker! O'Shaughnessy describes many popular *cannabis*-based preparations, including *majoon* (Ar. *ma' -jūn* 'kneaded', or 'electuary'), the same drink that de Orta's friend Sultan Bahadur had used in the sixteenth century, to induce fantasies of world travel by night. O'Shaughnessy tells us that *majoon* is, ". . . a compound of sugar, butter, flour, milk, and *sidhee* or *bang*" (O'Shaughnessy 1839a: 7). These ingredients are prepared in an elaborate fashion to produce a kind of *cannabis* fudge or halwa which is divided into small lozenge-shaped pieces and sold at four rupees a seer [about 2lbs].

O'Shaughnessy notes that there are seven or eight *majoon* makers in Calcutta, and that

¹ O'Shaughnessy's informant Kamalakantha Vidyalanka is mistaken in finding reference to *gañjā* in the *Manusmṛti*. The references in Manu 5.5 and 5.19 are to *grñjana* 'scallions', not to *gunjara* or *gunjah* (O'Shaughnessy 1839a: 9-10).

. . . all classes of persons, including the lower Portuguese, or 'Kala Feringhees,' and especially their females, consume the drug; that it is a most fascinating in its effects, producing extatic happiness, a persuasion of high rank, a sensation of flying, voracious appetite, and intense aphrodisiac desire.

The recipe for another popular hemp drink is given by O'Shaughnessy as follows (O'Shaughnessy 1839a: 7):

About three tola ^{*} [80 tolas to a seer] weight, 540 troy grains, [of resinous dried *cannabis*] are well washed with cold water, then rubbed to powder, mixed with black pepper, cucumber, and melon seeds, sugar, half a pint of milk, and an equal quantity of water.

O'Shaughnessy's historical and descriptive information is fascinating and valuable for our present purpose, which is to clarify the uses of *cannabis* in pre-modern Indian herbal medicine. But from the medical and scientific point of view, the greatest contribution of O'Shaughnessy's little book was his record of a series of carefully observed clinical experiments with *cannabis*. He began by testing *cannabis* on animals, to establish its non-toxicity (O'Shaughnessy 1839a: 16):

Ten grains of Nipalese churrus, dissolved in spirit, were given to a middling-sized dog. In half an hour he became stupid and sleepy, dozing at intervals, starting up, wagging his tail, as if extremely contented; he ate some food greedily; on being called to, he staggered to and fro, and his face assumed a look of utter and helpless drunkenness. . . . in six hour he was perfectly well and lively.

^{*} 11.664 grams [editor's note]

O'Shaughnessy tested *cannabis* on other dogs, and on fish, cats, pigs, vultures, crows, adjutants (storks, presumably), horses, deer, monkeys, goats, sheep, and cows. These tests taught him that controlled doses of *cannabis* did not lead to convulsions or other serious toxic effects. O'Shaughnessy then started to work with human patients, giving hemp to several sufferers of acute rheumatism. The effects were either negligible, or entirely beneficial. His next description is of a sad case of rabies. The patient ultimately died, but through the application of hemp, O'Shaughnessy was able to alleviate the patient's dreadful suffering over several days:

. . . the awful malady was stripped of its horrors; if not less fatal than before, it was reduced to less than the scale of suffering which precedes death from most ordinary diseases (O'Shaughnessy 1839a: 21).

O'Shaughnessy went on to describe his use of hemp to treat cholera, tetanus, and infant convulsions. In almost all cases the effects are reported as beneficial, offering pain relief and calming the patients. He also reports the successful trials of the same type by other Calcutta physicians, including Mr. O'Brian, Dr. Bain, and his cousin, Richard O'Shaughnessy. Regarding tetanus, he concluded (O'Shaughnessy 1839a: 26-7),

The facts are such at least as justify the hope that the virtues of the drug may be widely and severely tested in the multitudes of these appalling cases which present themselves in all Indian hospitals.

For O'Shaughnessy, *cannabis* was showing serious promise as an anaesthetic and relaxant. It is, perhaps, worth taking a moment to place O'Shaughnessy's work in a historical relationship to the search for surgical and dental anaesthesia. Many of O'Shaughnessy's experiments were aimed at controlling pain, even in the case of terminally ill patients. Seven years after O'Shaughnessy's work on *cannabis*, James Esdaile began exploring the use of mesmeric anaesthesia in his Calcutta clinic (Ernst 1995). In fact,

O'Shaughnessy was one of the official visitors to Esdaile's clinic, and contributed to the official report on the work, albeit critically. At about the same time, in 1846, Crawford Long, Horace Wells, and William Morton demonstrated the use of ether in Boston (Cole 1965), and in 1847, in Edinburgh, Simpson presented his discoveries relating to chloroform (Simpson 1848). The search for methods of alleviating pain was topical at this period, and O'Shaughnessy's work seems to fit well into the pattern of early experiments in this area, although to my knowledge it has never been included in the received history of anaesthesia.

4. Indigenous evidence

De Orta and O'Shaughnessy provide important early European voices on Indian *cannabis*, and through their reports we are already able to discern some features of the traditional uses and attitudes to the plant. But what of the indigenous voices on the same subject?² As we have seen, today's authors tend to idealize ancient India's relationship with *cannabis*, arguing that there was a golden age in India when *cannabis* was wholly and successfully integrated into daily life. But when making such claims, modern books all seem to quote each other and a small number of articles on this topic by non-professionals (i.e., non-Sanskritists).

To what extent, then, is this claim true, if at all? A careful examination of the references to *cannabis* in pre-modern India turns up some surprises, the first of which is that reliable references to *cannabis* do not date from before about AD 1000.

5. Absence of early references

It is common for even learned authors to cite references to *cannabis* in the earliest Indo-European literature of Asia, including the Vedas, which are datable to the second millennium BC. For example, the word *bhaṅga* occurs in the *Atharvaveda*:

² For a bibliography of studies on *cannabis* in Indian medicine and culture, see Meulenbeld 1999-2000: IIb.232, note 1106.

15. The five kingdoms of plants, having Soma as their chief (*śreṣṭha*), we address; the *darbhá*, hemp, barley, *sáha* – let them free us from distress.³

This is cited as evidence that *cannabis* was known and used at an early period (Macdonell and Keith 1982: ii.93). But the painstaking re-examination of this and similar passages by Meulenbeld (1989), building on the nineteenth-century study by Grierson (1894), reveals that we cannot be certain that these references are in fact to *cannabis*. In each case, they can be explained in other ways. Furthermore, the earliest references turn out to be to *bhaṅga*, not *bhaṅgā*. This is the difference between a masculine or neuter Sanskrit noun, and a feminine one.

Cannabis is always feminine in Sanskrit, and a difference in grammatical gender cannot be ignored when interpreting ancient passages. The masculine word *bhaṅga* is a perfectly common word meaning a 'break, rupture, fracture', although it is true that in the AV passage mentioned, it is one item in a list of grasses. Similar arguments have been applied to other early occurrences of the various synonyms for *cannabis*. The word *vijayā*, for example, meaning 'conqueror' is also the name of another widely-used plant, *haritakī* or *Terminalia chebula* Retz. (Meulenbeld 1989: 62 n. 4).

To be absolutely certain that a reference to *cannabis* is intended in a pre-modern text, therefore, we need to find a description of the plant's morphology, a reference to its effects, or some other indication that is unambiguous. The mere isolated occurrence of one of the later synonyms for the plant is not sufficient evidence.

6. Earliest clear references

Varigāsena On this basis, the earliest incontestible reference to *cannabis* so far identified comes from the "Compendium of the essence of medicine"

³ AV 11.6.15 (Whitney and Lanman 1993: ii.642). Other vedic passages include RV 9.61.13 (*bhaṅga* = *soma*), AV 8.8.3 (*bhaṅga*); see also Pāṇini 5.2.4 (an agrarian crop), and Kātyāyana's *vārttika* on P. 5.2.29.

(*Cikitsāsārasaṅgraha*) by the Bengali author Vaṅgasena who flourished in the period 1050-1100 (Meulenbeld 1999-2000: IIa.228-29). In a chapter on appetisers and digestives, Vaṅgasena mentions *cannabis* under the name *bhaṅgā*, calling it "a drug like opium whose mode of action is to pervade the whole body before being absorbed and digested" (Meulenbeld 1989: 64; Meulenbeld 1999-2000: IIa.226).⁴ Vaṅgasena also prescribes *cannabis* under the names *indrāśana* and *tribhavanavijaya* in two recipes for promoting long and healthy life.⁵ The contexts, synonyms, and purposes of Vaṅgasena's uses of the words confirm clearly that he knew *cannabis*.

However, his reference to opium is confused: he knows the name, but thinks it is the foam (*phena*, perhaps venom?) of a snake (*ahi*), a confusion we see also in some later authors (see Wujastyk 2001: 307, n. 3 for discussion). It has long been known that opium is a fairly late arrival in India and, since it is mentioned in confused terms by an early author in the same verse as *cannabis*, perhaps we can conjecture that the two substances were introduced to India together, or at least at a similar time.

Cakrapāṇi According to the great nineteenth-century scholar Grierson (1894), the next testimony for *cannabis* comes from Cakrapāṇi Datta, who was also from Bengal. Cakrapāṇi flourished at the same time as Vaṅgasena, probably composing his works between 1075 and 1100. His father Nārāyaṇa was a minister and superintendent of kitchens at the court of the Pāla dynasty of Bengal. These kings were famous patrons of the arts, and a beautifully illustrated manuscript exists in the Wellcome Library in London was created during Cakrapāṇi's lifetime by King Vigrahapāla III.⁶ Descendants of Cakrapāṇi's family are still extant, living in Shillong in Meghālaya state (Meulenbeld 1999-2000: IIa.92-93). Cakrapāṇi Datta was a great scholar of medicine, and wrote numerous learned commentaries and

⁴ *pūrvam vyāpyākhilam kāyaṃ tataḥ pākāṇ ca gacchati/
vyavāyī tad yathā bhaṅgā phenam cāhisamudbhavam*//19//
Dīpanapācanadravyalakṣaṇādhikāra, verse 19 (Rāya and Rāya 1983: 878).

⁵ *Rasāyana* 143 and 407 (Rāya and Rāya 1983: 740, 760).

⁶ The *Aṣṭasāhasrikāprajñāpāramitā*, shelved at Wellcome Indic € 1.

treatises, attaining a position of scholarship and authority in classical Indian medicine arguably unequalled after his time.

However, research published only this year by Meulenbeld (1999-2000: IIa.444) now sadly invalidates Grierson's claim to have found *cannabis* in Cakrapāṇi's writings. The particular work in which Grierson found the references is a Sanskrit and Bengali dictionary of herbal terminology, the "Moonlight of Words" (*Śabdacandrikā*). The references are certainly there, and the work is certainly by someone called Cakrapāṇi Datta. But it now transpires that there are two medical authors called Cakrapāṇi Datta, or else that a work by the original Cakrapāṇi was heavily revised and reworked by a later hand. In any case, the dictionary refers to fruits which were introduced into India from South America, so parts of the work at least must be post-1500, i.e., after the arrival of the Portuguese in Goa.

Dhanvantarīyanighaṇṭu India has an old tradition of compiling dictionaries and word indexes for various purposes. This tradition was extended to medicine at an early time, and there exists a large number of medical lexicons of different types. One of the more prominent of these works is the *Lexicon of Dhanvantari* (*Dhanvantarīyanighaṇṭu*), Dhanvantari being the Indian equivalent of, perhaps, Aesclepius. In its present form, this lexicon is datable to the eleventh century (Meulenbeld 1999-2000: IIa.173). We know little about its author, but some manuscripts ascribe the work to Mahendrabhogika, a resident of the town today called Thaneshwar, in Haryana, near Delhi. This work refers to *cannabis* (*vijayā*) in verses which describe it unmistakably: a characteristic synonym cluster occurs; the narcotic effect is explicitly mentioned.⁷

⁷ *vijayā rañjikā bhaṅgī tandrākṛdbahuvādinī /
mādinī mādikā māduḥ proktā gañjākinis tathā // 130 //
gunāḥ -
bhaṅgī kaphaharī tiktā grāhiṇī pācanī laghuḥ /
tikṣoṣṇā pittalā mohamandavāgvahnivardhinī // 131 //
Dhanvantarīyanighaṇṭu 1.130-131 (Purandare 1986: 31).*

Classical Indian medicine developed at an early period a well-defined set of categories for classifying plants and their medicinal properties. A medicinal substance may have up to four principle ingredients: flavouring (*rasa*), potency (*vīrya*), post-digestive flavouring (*vipāka*), and inherent efficacy (*prabhāva*). Each of these ingredients may have a set number of values.⁸ Using these classical categories, Dhanvantari's *Lexicon* lists the medical properties of *cannabis*: it removes humoral phlegm, it is sharp, it aids digestion, and it is light. Being sharp and 'heating', it increases humoral bile, and it stimulates delusions, slows speech, and raises the heat of the digestive fire. This is the earliest Indian work so far identified which lists the effects of *cannabis* in any detail.

Cannabis is also listed in similar terms in later medical dictionaries such as the still early and important work written by the Gujarati scholar Soḍhala in the early 1200s.⁹ Using the name *bhr̥ngī*, alongside other synonyms, Soḍhala adds to the list of *cannabis*'s qualities that it is aphrodisiac, and sleep-inducing. He also calls it "swindler's bride", though for what reason is unclear.

Yogarātnamālā The next definitive citation of *cannabis* is in a work on Tantric magic, which includes medical materials, called "The Garland of Jewels of Yoga" (*Yogarātnamālā*), by Nāgārjuna (Meulenbeld 1999-2000: IIa.1935). Amongst procedures and mantras for various extraordinary magical and sexual operations, the text recommends the use of the smoke of *cannabis* (*mātulānī*) as a drug which makes one's enemies feel that they are possessed by evil spirits (Meulenbeld 1989: 64). This work, datable to the twelfth or early thirteenth century, may come from Gujarat. "The Garland of Jewels of Yoga" is of interest not only as an early testimony to *cannabis*, but because of the association of *cannabis* with magical acts, and in particular with the tantric subculture. *Cannabis* has historically had perhaps

⁸ See, e.g., Meulenbeld (1987), Rao and Sudarshan (1985-1987: ii.142 ff, *et passim*), and Wujastyk (2001: 245 *et passim*) for further details.

⁹ Meulenbeld 1989: 64; Meulenbeld 1999-2000: IIa.216. *Soḍhalanighaṇṭu* I.77 (*nīdrākaram*), I.663 (*dhūrtavadhūḥ*) II.58, II.569 (*kāmadā*); *Gadanīgraha* (Sharma 1978: 7, 75, 95, 140).

its greatest use as a narcotic amongst the *sādhus*, renouncer monks of India. These are the people we saw recently on our televisions, jumping into the river in their millions at Allahabad, on the occasion of the Kumbha Mela.

Śārṅgadharma The author Śārṅgadharma wrote a medical compendium in the fourteenth century which, for reasons which I have outlined elsewhere (Wujastyk 2001: 305ff.), became one of the best loved and most widely used works on medicine in India in the last half millennium. Manuscript copies are to be found in abundance in libraries all over the sub-continent. This work includes a small number of medical recipes which definitely contain *cannabis*. Śārṅgadharma repeats Vaṅgasena's statement that *cannabis* acts quickly by first spreading throughout the body, and only later being metabolised. He also knows it as an intoxicant (*mada*). In his chapter on medical compounds, he lists *cannabis* amongst the ingredients for a remedy for cough, wheezing, loss of appetite, and wasting, and in another tonic to be taken with honey for various problems including diarrhoea, anaemia, and weight loss.¹⁰

Śārṅgadharma's *Compendium* is widely used today as a source of recipes by the Indian ayurvedic pharmaceutical industry, and it would be interesting to see whether these particular recipes containing *cannabis* are amongst those being manufactured for sale today, as a sort of modern incarnation of Collis Brown's Chlorodyne.¹¹

From the time of Śārṅgadharma onwards, *cannabis* becomes relatively commonplace in medical literature, and we do not need to trace its every occurrence. However, there is a non-medical text which brings us back to the use of *cannabis* amongst the *sādhus*, or wandering religious renunciates.

Dhūrtasamāgama The "Conference of Rogues" (*Dhūrtasamāgama*) is a fourteenth-century comic drama composed in 1324 by Jyotirīśvara

¹⁰ *Śārṅgadharasamhitā* 1.4.19cd-20ab, 1.7.203, 2.6.72 '*Jātīphalādicūrṇa*', 2.12.256 '*Grahaṇī Vajrakapāṭa*' (Srikantha Murthy 1984: 19, 48, 92, 181).

¹¹ J. Collis Brown's Chlorodyne, commonly used from the mid-nineteenth century to the 1940s and even later, contained morphine, ether, *cannabis* and treacle.

Kaviśekhara.¹² The first part of the play relates a wrangle between the religious mendicant Every City (*Viśvanagara*) and his pupil Bad Conduct (*Durācāra*) over a beautiful courtesan from the bazaar. The dispute comes to the court, and is tried by Judge Lower Class (*Asajjāti*). The judge decides to impound the lady for himself. While he is distracted, a clown arrives and tries to get the girl. A barber called Root Ripper (*Mūlanāśana*) arrives and claims repayment of a debt from the woman; she refers the barber to the judge, who pays the debt from his student's wallet, and then demands a haircut from the barber. The barber ties the judge up and absconds, leaving the clown to rescue the judge. In the middle of this Brian Rix farce, there is a *cannabis* moment. When the mendicants are before the judge, the latter demands payment of a deposit before he will give an opinion. One of the mendicants says

"Here is my gañjā bag; let it be accepted as a deposit. "

The judge (taking it pompously, and then smelling it greedily) says:

"Ah! [What good luck! I have managed to get hold of] some gañjā which is soporific and corrects derangements of the humours, which produces a healthy appetite, sharpens the wits, and acts as an aphrodisiac" (Grierson 1894: 261).

For all his lusts and corruptions, Judge Low Class has managed to list all the main properties of *cannabis* which were known in the learned medical literature of the day.

Ānandakanda Continuing with the theme of *cannabis* use amongst renunciate mendicants and alchemists, we come to the *Root of Bliss* (*Ānandakanda*).¹³ This is a gigantic work, consisting of about 6900 verses on tantric alchemy and yoga, datable from internal evidence to the twelfth

¹² Keith (1970: 261) argues for a date nearer to the reign of Narasiṃha of Vijayanagara (1487-1507); Raghavan *et al.* (1949-: 9.303) cite Winternitz for 1324.

¹³ White 1996: 167-9 *et passim*; Meulenbeld 1999-2000: IIa.583-92; Dash 1999: ch. 31. The following account is based chiefly on the last cited work.

or thirteenth century (Meulenbeld 1999-2000: IIa.592). It has been called "the most encyclopedic work of the entire Hindu alchemical canon" (White 1996: 167), and although much of the work is derivative of earlier authors, one innovation is a long and detailed chapter on *cannabis* (*vijayākālpa*: i.15.313-499).

The *Ānandakanda* describes the mythological origin of *cannabis* in terms which are standard in Indian legend: at the time of the creation of the world, the gods and demons churned the primal ocean, and certain substances, including *cannabis*, coagulated out of the mix. *Cannabis* is said to have different colours in the different ages of the world: from white in the original golden age, it becomes red, yellow, and in today's degenerate age it is green. In another fairly standard classificatory manoeuvre, *cannabis* is said to be of four different castes, *brāhmaṇa* (white), *kṣatriya* (red), *vaiśya* (green), and *śūdra* (black). With these categories in hand, the bazaar *cannabis* seller would have had ample combinatorial possibilities with which to beguile his customers.

The morphology of the *cannabis* plant is described in terms of being similar to the trident which is the symbol of Śiva. There are said to be eight types of *cannabis* plant, depending on whether the leaves of the plant have one, three, five, six, nine, ten, eleven, or thirteen leaflets. Particularly striking is the *Ānandakanda*'s knowledge of the gender of the plant, and that the female plants have the particularly narcotic properties and cause fainting when used in excess. It is also stated that the female plant has a synergistic action that enhances the effect of other medicines when added to them. The *cannabis* obtained from the male plant and the female plant after pollination is called *bhaṅgā*; the product of the unpollinated female plant is called *gañjā*.

The cultivation of the plant is described in some detail, with attention to the best times of year to grow the plant, and several religious rites and prayers which are to accompany planting and harvesting. Some unexpected features include watering the plants with mixtures such as water and butter, seawater, even alcohol and meat. Another odd procedure clearly underlines the alchemical milieu from which this text emanated: a small

hole is made in the tips of the plants and a drop of mercury is poured into the hole.

Ten types of *cannabis* user are listed: saints (*siddha*), sages (*muni*), women, people of the four castes, yogis, children, old people, medical patients, people suffering from impotence, and people with many wives. This fascinating list spans the whole socio-religious spectrum of *cannabis* use in pre-modern India, and highlights the fact that the plant had prominent religious as well as medical and social functions.

The *Ānandakanda* lists several types of *cannabis* medicines (*cūrṇa*, *modaka*, *vaṭikā*, *leha*, *pāka*, *dugdhapāka*, *kvātha*), as well as more recreational preparations such as sherbet (*śarbat*), barfee, laddu, *majūn*, betel. *Cannabis* can also be smoked in a chilum pipe.

The *Ānandakanda* is aware of the toxic potential of *cannabis*, and gives a detailed list of nine stages of toxic symptoms.¹⁴

Finally, the *Ānandakanda* describes rejuvenation treatment based on *cannabis*. This involves treatment over a long period in a specially constructed hut (*kuṭi*). This procedure is strongly reminiscent of a similar rejuvenation procedure described in the earliest Sanskrit medical literature, one that requires not *cannabis* but the unknown plant Soma. And that procedure itself echoes a rite of ritual rebirth that dates from the mid-first millennium BC.¹⁵

There are many other points made about *cannabis* in the *Ānandakanda*, which gives us the fullest account of *cannabis* at present known in Sanskrit literature.

¹⁴ 1. red eyes, dry tongue, lips, palate, and nose, hot breath. 2. closed eyes, rigid body. 3. burning feeling in feet, hands, eyes, choking voice. 4. hunger and thirst, sleepy eyes, rolling eyes. 5. choking voice, forgetfulness of recent events. 6. complete amnesia. 7. weakness in upper limbs and body, prostration. 8. disorientation, raised eyebrows, weeping. 9. shouting, fainting, coma, eructation, groaning, rolling on the ground, difficulty speaking, incoherence, disclosure of secret feelings, misery, collapse (Dash 1999: 254).

¹⁵ Meulenbeld 1999-2000: 589; White 1996: 169; Dash 1999: 246; Wujastyk 2001: 121.

Rājavallabhanighaṇṭu A medical lexicon by Rājavallabha, now available only in the eighteenth-century revision of Nārāyaṇadāsa Kavirāja, provides a verse which is perhaps the most widely cited description of *cannabis* of all, one frequently repeated by commentators in the nineteenth century:

Cannabis is the food of the god Śiva. It is sharp, hot, and intoxicating. It counteracts bleaching skin diseases (*kuṣṭha*). It gives strength, mental acuity, and digestive power, and it removes the phlegmy humour. It leads to long life (*rasāyanam*).

The text continues with a legend pertaining to the origin of *cannabis*:

Once upon a time, *Cannabis* (*vijayā*) was born from the churning of mount Mandara in the ocean of milk. It is a favourite of the god Śiva, and it is called 'Conquest' (*vijayā*) because it gives victory over the three worlds. It was received by men here on earth for the good of humankind. It is aphrodisiac, it destroys all worries, and it is exciting.¹⁶

Thus, Rājavallabha presents *cannabis* as a divine gift to mankind, and he lists its medical and other properties in clear terms.

¹⁶ *śakrāśanam tu tikṣṇoṣṇam mohakṛt kuṣṭhanāśanam /
balamedhāgnikṛc chleṣmadoṣahārī rasāyanam ||48||
jātā mandaramanthanāj jalanidhau pīyūṣarūpā purā
trailokyē vijayapradetī vijayā śrīdevarājapriyā /
lokānām hitakāmyayā kṣītītale prāptā naraiḥ kāmādā
sarvātāṅkavināśaharṣajanāni yaiḥ sevītā sarvadā*

Pariccheda 6, verse 48 (Śāligramavaiśya Māthuravaṃśīya 1895: 189). The second part of the verse *jātā* . . . *sarvadā* is not present in the editions available to me, but is cited and ascribed to this text, or a similar one called *Paryāyaratnamālā*, by both Grierson (1894) and Dutt (1877: 237). Cf. Meulenbeld 1999-2000: IIa.342 f.

Conclusion

It is clear that *cannabis* has played an important role in Indian medicine, alchemy and tantra. The latter point is taken up by Agehananda Bharati, a participant-observer of the Hindu ascetic tradition who describes typical *cannabis*-related tantric rites in some detail (Bharati 1975: 250, 253, 287, 301). Bharati develops a theory that *cannabis* was used by tantric adepts to overcome the resistance they may have felt to performing required religious procedures which deliberately crossed social taboos. The anthropologist Joe Alter observed *cannabis* in use amongst the ascetic wrestling groups whom he studied in the early 1990s (Alter 1997: 155):

At some *akharas* mashing almonds is done in tandem with the preparation of *bhang* (hashish). Almonds and *bhang* are often prepared in the same way insofar as *bhang* has to be smashed and ground into a paste. . . . The two pastes are occasionally drunk together when diluted and mixed into a potion called *thandai*. (*Thandai* can also refer to any cool drink made of mixed substances, usually milk, nuts, and fruits.)

And we have seen that medical texts include *cannabis* in the *materia medica* from the eleventh century onwards.

We started this paper by noting the contestation to which *cannabis* is currently subject. In earlier times in India, and in many circles even today, *cannabis* has had an accepted role in religious practice, in medicine, and as a social and recreational intoxicant. In fact, the consumption of drinks, sherbets, and sweets containing *cannabis* was, and in some circles still is, considered a rather higher-class foible than drinking alcoholic drinks. I shall close with the charming account given by the learned botanist and historian Uday Chandra Dutt, who wrote in Calcutta at the end of the nineteenth century:

On the last day of Durga pooja. . . , it is customary for the Hindus to see their friends and relatives and embrace them. After this

ceremony is over it is incumbent on the owner of the house to offer his visitors a cup of *bhang* and sweet-meats for tiffin.

An intoxicating agent with such recommendations cannot but be popular, and so we find it in general use amongst all classes especially in the North-West provinces and Behar. In Bengal it has latterly become the fashion to substitute brandy, but I well remember having seen in the days of my boyhood the free use of *bhang* among the better classes of people who would have shunned as a pariah any one of their society addicted to the use of the forbidden spirituous liquor. At the doors of many rich baboos, Hindustani durwans could be seen rubbing the *bhang* in a stone mortar with a long wooden pestle, and the paste so prepared was not solely intended for the use of the servants.

I do not mean to say that all classes of Hindoos without exception are or were addicted to the use of *bhang*. Some castes among the up-country men and some classes of people amongst Bengalis are as a rule very temperate in their habits and do not use any narcotic at all; but the ordinary run of orthodox Hindus, accustomed to have their little excitements, use *bhang* for the purpose without incurring any opprobrium such as would result from the use of spirituous liquors.¹⁷

At the end of the nineteenth century, then, *cannabis* was still considered by many to be a high-class recreation, an indulgent foible, perhaps, but nevertheless one which was favourably contrasted with the despised liquor.

References

Aldrich, Michael (1997). "History of therapeutic *cannabis*." In Mathre (1997), chap. 3, pp. 35-55.

¹⁷ Dutt 1877: 236.

Alter, Joseph S. (1997). *The wrestler's body, identity and ideology in North India*. Second ed. New Delhi: Munshiram Manoharlal.

Bell, John (1856, 1857). "On the haschisch or Cannabis Indica." In Mikuriya (1973). Reprinted from: *The Boston Medical and Surgical Journal*, v. 56, no. 11 (Apr. 16, 1857), pp. 209-216; v. 56, no 12 (Apr. 23, 1857), pp. 229-236.

Bharati, Agehananda (1975). *The Tantric tradition*. Second ed. New York: Samuel Weiser. [First published 1965]

Boxer, C. R. (1963). *Two pioneers of tropical medicine: Garcia de Orta and Nicolás Monardes*. Lecture Series no. 1. London: Wellcome Historical Medical Library.

Bridge, J. A. (1998). "Sir William Brooke O'Shaughnessy, M.D., F.R.S., F.R.C.S., F.S.A.: a biographical appreciation by an electrical engineer." *Notes and records of the Royal Society of London*, 51(1), pp. 103-120.

Calkins, Alonzo (1871). *Opium and the opium-appetite: with notices of alcoholic beverages, cannabis indica, tobacco and coca, and tea and coffee, in their hygienic aspects and pathologic relations*. Philadelphia: J. B. Lippincott. Chaturvedi *et al.*, C. N. (1981). "Medicinal use of opium and cannabis in medieval India." *Indian Journal of History of Science*, 16, pp. 31-35.

Clendinning, John (1843). "Observations on the medicinal properties of the cannabis sativa of india." *Medico-chirurgical transactions*, 26, [188]-210. Read May 9th, 1843.

Clusius, Carolus (1567). *Aromatum et simplicium aliquot medicamentorum apud Indos nascentium historia ante biennium quidem Lusitanica lingua per dialogos conscripta. . . nunc vero primum latina facta, et in epitomen contracta a Carolo Clusio Atrebate*. Antwerp: Plantin.

Cole, Frank (1965). *Milestones in anesthesia: readings in the development of surgical anesthesia 1665-1940*. Lincoln: University of Nebraska Press.

Dash, Vaidya Bhagwan (1999). *Fundamentals of Āyurvedic medicine*, vol. 85 of *Indian Medical Science Series*. Delhi: Sri Satguru Publications. [Revised and enlarged ed. First published 1978]

Dutt, Uday Chand (1877). *Materia medica of the Hindus. . . with a glossary of Indian plants by George King and the author*. Calcutta: Thacker and Spink. Reprinted, Varanasi 1980. Dutt (1980).

Dutt, Uday Chand (1980). *Materia medica of the Hindus. . . with a glossary of Indian plants by George King. Revised edition. . . by Binod Lall Sen and Ashutosh Sen and Pulin Krishna Sen*. third edn. Krishnadas Sanskrit Studies, vol. II. Varanasi: Chowkhamba Saraswatibhavan.

Ernst, Waltraud (1995). "Under the influence in British India: James Esdaile's Mesmeric Hospital in Calcutta and its critics." *Psychological Medicine*, 25, pp. 1113-1123.

Foulis, James (1900). "Two cases of poisoning by Cannabis Indica." In Mikuriya (1973: 55-65). [Reprinted from *Edinburgh Medical Journal*, 8, pp. 201-210]

Ghose, Saroj (1994). "William O'Shaughnessy: an innovator and entrepreneur." *Indian Journal of History of Science*, 29, pp. 9-22.

Gorman, Mel (1983). "Sir William B. O'Shaughnessy, pioneer chemical educator in India." *Ambix*, 30, pp. 107-116.

Gorman, Mel (1984-1985). "Sir William Brooke O'Shaughnessy, F.R.S. (1809-1889), Anglo-Indian forensic chemist." *Notes and records of the Royal Society of London*, 39, pp. 51-64.

Goudriaan, Teun and Sanjukta Gupta (1981). *Hindu tantric and śākta literature*, vol. 2.2 of *A history of Indian literature*. Wiesbaden: Harrassowitz. Great Britain. India Office (1893). *Return to an address of the Honourable The House of Commons, dated 21 February 1893; for, Copies of the following papers relating to the consumption of ganja and other drugs in India*, vol. 97 of *Reports and papers, Great Britain. Parliament. House of Commons*. London: Eyre & Spottiswoode for H.M.S.O. Ordered, by the House of Commons, to be printed, 3 March 1893.

Grierson, George Abraham (1894). "The hemp plant in Sanskrit and Hindi literature." *The Indian Antiquary*, 23, 260-62. Hubbard, Fred. Heman (1881). *The opium habit and alcoholism: A treatise on the habits of opium and its compounds; alcohol; chloralhydrate; chloroform; bromide potassium; and cannabis indica: including their therapeutical indications: with suggestions for treating various painful complications*. New York: A. S. Barnes & Co.

Jackson, Thomas Hayes (1857). "Cannabis Indica, its uncertain action: letter." *Edinburgh Medical Journal*, 2(7). Letter to the Editor of the *Edinburgh Medical Journal* dated Dec. 6, 1856.

Kardaswamy, Thiru N. (1979). *History of Siddha medicine*. Madras: s.n.

Keith, Arthur Berriedale (1970). *The Sanskrit drama in its origin, development, theory & practice*. Oxford: Oxford University Press. First published 1924.

Ludlow, Fitz Hugh (1857). *The Hasheesh cater: being passages from the life of a Pythagorean*. New York: Harper & Brothers.

Macdonell, A. A. and A. B. Keith (1982). *Vedic index of names and subjects*. Delhi: Motilal Banarsidass. 2 vols. [Reprint of London 1912 edition]

Mackenzie, Stephen (1887). "Remarks on the value of Indian hemp in the treatment of a certain type of headache" *British Medical Journal*, 1, pp. 97-8.

Mathre, Mary Lynn (ed.) (1997). *Cannabis in medical practice: a legal, historical and pharmacological overview of the therapeutic use of Marijuana*. Jefferson, NC, and London: McFarland & Co.

McMeens, R. R. (1860). "Report of the Ohio State Medicine Committee on *Cannabis Indica*." In Mikuriya (1973). [Reprinted from: *Transactions of the Fifteenth Annual Meeting of the Ohio State Medical Society at Ohio White Sulphur Springs*, June 12 to 14, 1860. pp. 75-100].

Meulenbeld, Gerrit Jan (1987). "Reflections on the basic concepts of Indian pharmacology." In Gerrit Jan Meulenbeld and Dominik Wujastyk (eds.), *Studies on Indian Medical History*, Groningen: Forsten, pp. 1-17

Meulenbeld, Gerrit Jan (1989). "The search for clues to the chronology of Sanskrit medical texts as illustrated by the history of bhaṅgā" *Studien zur Indologie und Iranistik*, 15, pp. 59-70.

Meulenbeld, Gerrit Jan (1999-2000). *A history of Indian medical literature*. Groningen: E. Forsten.

Mikuriya, Tod H. (ed.) (1973). *Marijuana: medical papers, 1839-1972*. Oakland, California: Medi-Comp Press. Full text available at <http://www.mikuriya.com/althealth/mmp.html>.

Moreau de Tours, Jacques-Joseph (1845). *Du Haschisch et de l'aliénation mentale. Etudes psychologiques*. Paris: Masson.

Orta, Garcia de (1563). *Coloquios dos simples e drogas e cousas medicinais da India*. . . Goa: J. de Endem.

Orta, Garcia de (1987). *Colloquies on the simple[s] and drugs of India, translated by Clements Markham*. Delhi: Sri Satguru Publications, Delhi 1987 edn. [First published London, 1913]

O'Shaughnessy, William Brooke (1839a). *On the preparations of the Indian hemp, or gunjah, (Cannabis Indica) their effects on the animal system in health, and their utility in the treatment of tetanus and other convulsive disorders*. Calcutta: Bishop's College Press.

O'Shaughnessy, William Brooke (1839b). "On the preparations of the Indian hemp, or gunjah, (cannabis indica) their effects on the animal system in health, and their utility in the treatment of tetanus and other convulsive disorders." In Mikuriya, q.v., (1973: 3-30). [Reprinted from: *Transactions of the Medical and Physical Society of Bengal*, 1838-40, pp. 421-461].

O'Shaughnessy, William Brooke (1841). *The Bengal dispensatory and pharmacopocia. Chiefly compiled from the works of Roxburgh, Wallich, Ainslie, Wight and Arnot, Royle, Pereira, Lindley, Richard, and Fee, and including the results of numerous special experiments*. Calcutta: Bishop's College Press.

Ott, Jonathan (1993). *Pharmactheon: entheogenic drugs, their plant sources and history*. Kennewick, WA: Natural Products Co.

Passmore, R. Reginald (1998). "To ban or not to ban: that is the question." *Proceedings of the Royal College of Physicians of Edinburgh*, 28(3), 449. Letter to the editor.

Purandare, Viṭṭhala Nārāyaṇaśarman (ed.) (1986). *Rājanighaṇṭusahito Dhanvantarīyanighaṇṭuḥ*, vol. 33 of *Ānandāśramasaṃskṛtagranthāvalih*. Poona: Ānandāśrama.

Rabelais, François (1955). *Gargantua and Pantagruel: translated and with an introduction by J. M. Cohen*. London: Penguin Books.

Raghavan, V., K. Kunjunni Raja, C. S. Sundaram, N. Veezhinathan, and N. Gangadharan (1949-). *New Catalogus Catalogorum, an alphabetical register of Sanskrit and allied works and authors*. Madras University Sanskrit Series. Madras: University of Madras. [References to vol.1 are to the revised 1968 edition]

Randall, Robert C. (1997). “Glaucoma: a patient’s view.” In Mathre (1997), chap. 7, pp. 94-102.

Rao, S. K. Ramachandra and S. R. Sudarshan (1985-1987). *Encyclopaedia of Indian medicine*. Bombay: Popular Prakashan.

Rāya, Rāmak Kumāra and Rājīva Kumāra Rāya (eds.) (1983). *Vaṅgasenasamhitā (Cikitsāsāra saṃgraha)*, vol. 9 of *Dhanvantari Granthamālā*. Vārāṇasī: Prācyā Prakāśana.

Roşu, Arion (1982). “Yoga et alchimie.” *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, 132, pp. 363-79.

Śāligrāmavaiśya Māthuravaṃśīya (ed.) (1895). *Rājavallabhanighaṇṭu, Rājavallabhapraṇītaḥ, śrīmadbhiśakṣīromaṇi Nārāyaṇadāśena pratisaṃskṛtaḥ [with Bhāṣā ṭīkā]*. Mum̐baī: Lakṣmīveṅkaṭeśvara Press.

Sharma, Priya Vrat (ed.) (1978). *Soḍhala-Nighaṇṭu (nāmasaṅgraha and guṇasaṅgraha) of vaidyācārya Soḍhala*, vol. 164 of Gaeckwad’s Oriental Series. Baroda: Oriental Institute.

Sherman, Carol, Andrew Smith, and Erik Tanner (1999). *Highlights: an illustrated history of cannabis*. Berkeley, Toronto: Ten Speed Press.

Simpson, James Young (1848). *Account of a new anaesthetic agent [chloroform] as a substitute for sulphuric ether in surgery and midwifery, [Pamphlet 6] Communicated to the Medico-chirurgical Society of Edinburgh, 10th Nov. 1847*. Edinburgh: Sutherland and Knox.

Sloman, Larry (1979). *Reefer madness: the history of marijuana in America*. Indianapolis: Bobbs-Merrill.

Srikantha Murthy, K. R. (1984). *Śārṅgadharma-saṃhitā (A treatise on Āyurveda) by Śārṅgadharma, translated into English*. Varanasi, Delhi: Chaukhambha Orientalia.

White, David Gordon (1996). *The alchemical body: siddha traditions in medieval India*. Chicago: University of Chicago Press.

Whitney, William Dwight and Charles Rockwell Lanman (1993). *Atharva-Veda-Saṃhitā, translated into English with critical and exegetical commentary*, vol. 7 of Harvard Oriental Series. Delhi: Motilal Banarsidass. [Reprint of 1905 edition]

Wissett, Robert (1804). *On the cultivation and preparation of hemp; as also, of an article, produced in various parts of India, called sunn, which, with proper encouragement, may be introduced as a substitute for many uses to which hemp is at present exclusively applied*. London: Cox and Son.

Wujastyk, Dominik (2001). *The roots of Ayurveda: Selections from Sanskrit medical writings*. Second edn. New Delhi: Penguin.

Yule, Henry and A. C. Burnell (2000). *Hobson-Jobson: a glossary of colloquial Anglo-Indian words and phrases*. . . . New Delhi: Munshiram Manoharlal. Originally published in 1903.

EVIDENCE OF THE USE OF AYURVEDIC MEDICINE IN THE MEDICAL INSTITUTIONS OF PORTUGUESE INDIA 1680-1830

Timothy Walker
Boston University and Universidade Aberta
Boston

During the closing decades of the eighteenth century, when Ignácio Caetano Afonso, the *físico-mor* (chief physician) of the *Estado da Índia*, undertook the treatment of Portuguese soldiers afflicted with the seasonal fevers associated with the onset of monsoon at the *Hospital Militar* of Goa, he resorted to familiar medical techniques and medicines at his disposal. While some medicines to combat fevers had been sent from Portugal and were available in the hospital *botica*, or pharmacy, the ethnically diverse colonial staff also commonly made use of two local plant-based remedies. One was sandalwood. Ground into dust and mixed with water or other plant juices to make a cooling paste, this typical Malabar Coast aromatic wood had been spread on the body of patients to reduce fever for generations. In classical Ayurveda as in traditional Goan medicine, sandalwood was a long-accepted treatment for fever, as well. Another similar treatment utilized the root of a thorny tree found in abundance in Goa, which the Portuguese called *pinheiro-de-joão-lopes* (i.e., "João Lopes's pine-tree"). Known in the Konkani language of Goa as *tellfoll* or *tefoll* (whence *tellfolans*, lit. a plural, phonetically written in Portuguese documentation), this plant also was precious to Goan *vaidyās* (practitioners of traditional medicine) as a fever-reducer.

Therefore, at a time when other European powers sought to impose Western medicine on their colonial subjects, the chief state physician and his staff in Portuguese India used a curious blend of contemporary European and traditional indigenous medical practices. Doctor Afonso is just one example of a relatively common phenomenon in Goan medical institutions of the late seventeenth to the early nineteenth centuries: hospitals, pharmacies and infirmaries employed numerous

native-born practitioners whose training and outlook toward healing reflected a blend of Indian and European cultural influences.

This paper seeks to provide an overview of the hybrid medical culture found in the Portuguese colonial enclaves in India between approximately 1680 and 1830. My intent is to draw attention to the Indo-Portuguese functionaries who practiced medicine in state and religious medical institutions at this time, consider the cultural influences that shaped their diverse remedies, and look at some of the indigenous drugs they applied to patients in those institutions.

Ignácio Cactano Afonso was a native Goan, born into a Portuguese-speaking Indo-European family and raised as one of an elite class in Portuguese colonial society. From an early age, his passion was medicine. In time, though he had access to little formal medical training, he gained a very favourable reputation as a healer. In March 1798, in a letter to the Portuguese Secretary of State in Lisbon, the Governor of the *Estado da Índia*, Dom Rodrigo de Souza Coutinho, described Afonso as “a Brahmin... favored with natural talents” for healing. The Governor continued to praise Afonso, saying that “notable cures” had been attributed to him, even though he “had not opened any [medical] book for many years.” The following year, after Afonso’s death, Governor Souza Coutinho would write that Afonso had “the sense of a *médico*, and practiced for many years, which compensated for the defects of his [medical] education.”

While Afonso appears to have studied informally in Goa at the *Hospital Militar* under his predecessor, the Portuguese-born, Coimbra-trained physician Luís da Costa Portugal (who, it is worth noting, had made a practice of taking in promising Goan healers and training them in Western medical techniques), Afonso’s medical knowledge consisted primarily of native Indian plants and their medicinal applications. In the main, Afonso effected his cures on Portuguese soldiers, officials and colonists with local remedies derived from indigenous Indian drugs – medicines that Afonso learned from older Goan healers, who had employed them since time out of memory.

Names for the Goan system of popular medicine vary. Common monikers include *zhadpalyachem vokot*, *palamulachem vokot* and *ganvti vokot*. These terms connote medicine obtained from plants, their roots and leaves. *Ganvti vokot* literally means “medicine belonging to the village.” While *zhadpalyachem* and *palamulachem* denote only applied herbal medicine, *ganvti vokot* has a wider meaning, encompassing religious rituals, trance, medicinal diet regimes and fasting, penance, as well as other popular healing techniques. Ignácio Caetano Afonso was, at least in part, a product of this rich healing culture.

After *físico-mor* Luís da Costa Portugal returned to Lisbon in 1782, leaving no university-trained European physician in Goa to take his place, Afonso, because of his exceptional reputation as a healer with country medicines, assumed the role of chief physician in Portuguese India. Eventually, the colonial government formally nominated Afonso to fill that vacant post.

The new native-born *físico-mor* demonstrated his worth in a variety of ways. His chief responsibility was to supervise Goa’s largest health care institution, the military hospital (including the care and treatment of its three thousand annual patients on average), its pharmacy and garden of indigenous medicinal plants. In 1794, Afonso was given an opportunity to display his knowledge of indigenous medicine for Imperial authorities in Lisbon. The *Conselho Ultramarino* seeking medicines to treat tropical diseases throughout the Portuguese maritime colonial network, commissioned Afonso to write a description of all the useful medicinal roots found in Portuguese India. The *físico-mor* produced a twenty-four-page booklet, which he entitled *Discripçoens e Virtudes das Raizes Medicinaes* (Descriptions and Virtues of Medicinal Roots); he provided it as a “recommendation” to the incoming colonial Governor General. This manuscript booklet included a detailed discussion of five fundamental medicinal roots of the Indian Ocean basin, along with notes about the use and efficacy of their respective plants and seeds. Afonso described various maladies for which these roots could be prescribed, and provided details about the preparation of each remedy derived from such plants. As might be expected, much of the information Afonso imparted to Portuguese crown

authorities mirrors techniques written long before in the classical ayurvedic texts.

One example of the medicinal roots to which Afonso referred was the celebrated *pau-de-cobra*, or “cobra wood,” a name applied to several varieties of plant root known across south India and thought to be effective against snakebite. According to Ignácio Afonso’s manuscript, *pau-de-cobra* was known in Ceylon, the plant’s native home, as *hampaddu tanah* – Afonso rendered the name phonetically in his Portuguese-language text. In Goa, Afonso says the plant was well known among indigenous “herbalists,” but that the plant was generally referred to by the Portuguese name, *pau-de-cobra*.

Pau-de-cobra had long held a place in Indo-Portuguese medicine. A discussion of this root appears in Garcia de Orta’s text of 1563; three varieties are named, plants with origins in Ceylon and south India. De Orta asserts that at least one of these varieties, called *mordexi*, grew on the “island of Goa,” and that south Indian healers also used the root to treat rheumatism, smallpox, measles, and cholera. Similarly, Sebastião Dalgado’s *Glossário Luso-Asiático* includes an extensive entry on *pau-de-cobra*, and cites references to this medicine in half a dozen Indo-Portuguese publications of the sixteenth and seventeenth centuries. Dalgado identifies the root with *Aristolochia indica*, *Rauwolfia serpentina*, or *Strychnos colubrina* (named under Linnaeus’ system), all of which have accepted analogous applications according to classical ayurvedic treatment.

*

Portuguese efforts to establish colonial enclaves in India included, almost from their inception, the founding of health care institutions. This was, of course, a pragmatic state policy: a logical response to the terribly high mortality rates Europeans experienced in monsoon Asia. Then, too, Portuguese colonialism depended on an active Catholic missionary effort, and most ecclesiastical orders considered caring for the sick – whether European colonists or newly-converted indigenous peoples – to be an integral part of their activities. So, Portuguese India had a lengthy tradition

of supporting medical facilities that blended Western and eastern influences.

By the first quarter of the seventeenth century, Goa could boast of two hospitals operated by the *Santa Casa da Misericórdia*: those of *Nossa Senhora da Piedade* and *Todos os Santos*. The latter, older by a century, had been founded in about 1524 and was open to persons of any race. These were amalgamated for reasons of financial expediency in 1681. By the middle of the eighteenth century, however, this combined hospital was so impoverished that it could only admit ten to twenty adults each year, and after 1755 the facilities were only open to white adults or foundlings of European descent. Also in Goa, there existed the famous *Hospital Real do Espírito Santo*, which was widely praised for its quality. Its facilities were reserved, however, mainly for Portuguese soldiers and officials of the India garrison.

During the early stages of colonization at Goa, the Portuguese garrison, missionaries and traders made use of local medical practitioners simply because of the scarcity of Portuguese *médicos*. Indian physicians, called *vaidyas*, enjoyed the patronage of their new rulers in part because these Goan doctors better understood the proper treatment of tropical disease. Several *vaidyas* held important posts in Goa through the sixteenth and seventeenth centuries, serving as personal physicians to at least one governor (António Moniz Barretto in 1574), a viceroy (the Conde de Aveiras in 1644) and other members of the aristocracy. Indian doctors also could be found treating patients at the Jesuit *Colégio de São Paulo* and the *Convento da Madre de Deus*; one even served as the *físico-mor* of the region in the 1640's.

Even so, in the seventeenth century, the Portuguese moved to regulate Indian physicians, subordinating local methods to orthodox European practice. Increasingly, *vaidyas* were forced to pass examinations administered by the Portuguese *físico-mor* before they could practice medicine in Portuguese-held territory. A vice-regal decree of 1618 required that anyone wishing to practice medicine in Portuguese India submit to this qualifying exam, and the total number of indigenous healers permitted to practice in Goa was limited to thirty. *Físicos-mores* during this earlier,

more affluent period were almost invariably Portuguese-born physicians trained in Western medicine at the University of Coimbra. The examination in the Indian colonies consisted mainly of clinical diagnosis and treatment of a range of maladies, including tropical diseases. Even if many locally-born physicians in Goa still applied remedies based upon their own long tradition of Indian medicine, the standard for proper medical knowledge and practice in Goa under Portuguese administration was, at least officially, increasingly European.

For example, European-trained medical professionals remained perpetually in high demand in the colonies. In 1691, King Pedro II sent two Coimbra-trained doctors to Goa with the express purpose of training locally-born students, either of aboriginal or European descent, as medical professionals. These men created a modest training facility in Goa, attached to the Royal Hospital located there, to which even the *Lcal Senado* in Macao was known to send picked youths, the sons of Portuguese families resident in Macao, to study continental medical techniques. However, this initiative was to be short-lived and have a limited long-term effect.

King Pedro II's policy reveals a conceit for European medical training, despite demonstrations of its limitations and the efficacy of Asian medicine. Municipalities and territories of the *Estado da Índia* were always desperate for physicians to fill chronic shortages created by an unwillingness of qualified continental Portuguese *médicos* to relocate out to the colonies. Consequently, there was always an active traffic in skilled Western physicians throughout the Far East, with professionals from many European maritime nations circulating among the European colonies, selling their services to the highest bidder and moving on in response to better offers. Despite crown efforts to train colonial doctors in Goa according to a Coimbra-based medical curriculum, such attempts never managed to fill all the vacancies in the colonies. European surgeons and physicians remained a treasured commodity in the far east until the nineteenth century, particularly among European-born officials.

However, such a pre-conceit for European medical training, expressed in the official policy of 1618 directed at reducing the numbers of indigenous healers, did not prohibit the use of indigenous plant-based

remedies that experience had shown to be effective. Many local medicines had already become firmly embedded in the medical culture of Portuguese India; these could be found in the local hospitals and infirmaries run by the state or missionary orders.

Simple demographics and the eventual eclipse of *Goa Dourada* (Gilded Goa), however, would ensure that the ascendancy of European medical authority could not be sustained with the same vigor in Portuguese India as it was to be in British India. Though European influences and conventions set the salient tone for institutional medical culture of the *Estado da Índia*, these currents were mediated in Goa, Daman and Diu by a strong native presence among health care professionals.

As the focus of Portuguese overseas endeavours shifted to the Atlantic after 1670 and the number of European-born residents in the eastern colonial enclaves diminished, colonial officials increasingly acquiesced to the pragmatic expedience of filling vacant medical posts with native-trained physicians and surgeons (though they had to be of Christian families).

During the one-hundred-fifty-year period from 1680 to 1830, after the focus of the Portuguese maritime empire had shifted decisively from Asia to the Atlantic sphere, the *Estado da Índia* ceased to be an attractive destination for the majority of European-born and -trained medical professionals who departed for *Ultramar Português*. Those Portuguese physicians and surgeons who did emigrate to colonial outposts during this period generally opted to settle in economically vibrant areas like Brazil, the Azores or Madeira, where their prospects for a comfortable living were much brighter than in contemporary Goa, Daman or Diu.

There were other reasons why university-trained, state-licensed physicians and surgeons elected to stay in Portugal. A shortage of approved medical practitioners in the eastern colonies was, in part, a function of a shortage of skilled sanctioned healers in the metropole. Simply put, there was plenty of promising remunerative work at home for licensed doctors and surgeons. By the late seventeenth century, a national preoccupation with plague and epidemics occasioned many doctors being drawn from the country's interior to the port facilities along the coast.

They were attracted by better opportunities for employment and income, as well as by crown requests for assistance in guarding the nation against seaborne disease arriving on foreign merchant ships. The crown simultaneously tried to provide incentives to draw physicians to the far eastern enclaves but, in the eighteenth century, such inducements were not sufficient to provide needed trained, licensed healers to Portuguese India.

Another factor insuring the continued use of Indian medicine was the lingering backwardness of Portuguese university medical training on the continent until the Pombaline reforms of the 1770's. Even by contemporary European standards, continental Portuguese medical practice at the turn of the eighteenth century, mired as it was in medieval traditionalism and encumbered by the reactionary weight of Holy Office or Jesuit controls on education and the free flow of ideas, was infamously primitive. Moreover, as the century wore on and technological advances elsewhere in Europe widened the gap between the state of the physician's art in Lisbon and, say, London, Paris or Leiden, Portuguese medical practitioners became increasingly conscious – indeed, self-conscious – of their own deficiencies. Such a consciousness may well have had repercussions felt in the Indian enclaves and contributed to a more experimental nature toward medicine.

In the Portuguese enclaves on the Malabar Coast of India, therefore, state hospitals and pharmacies came to rely increasingly on native-born staff to fill even the highest medical posts. Although, officially, colonial administrative policies advocated the nomination of European physicians, surgeons and pharmacists whenever possible, in practice a chronic lack of medical staff with Western qualifications meant that the treatment of government personnel and the military garrison was often of necessity entrusted to native-born, locally-trained healers. This situation continued until the founding of the Goa Medical and Surgical School in 1842.

To be sure, local Goan medical men who found positions in Portuguese colonial hospitals or infirmaries were expected to have at least a rudimentary understanding of Western medical practice. In theory, native-born medical staff was supposed to undergo an apprenticeship and be tested

by their older Western-trained colleagues. Nevertheless, the practical circumstances of their upbringing meant that homegrown healers also brought a deep well of indigenous medical knowledge to their work in colonial institutions. Many of the best medicines at hand, after all, were local plant-based remedies, some knowledge of which Goans of any class or religion had acquired while growing up.

Of course, many of the diseases that doctors or surgeons, regardless of their racial or cultural background, confronted in the colonies were maladies peculiar to the tropics – illnesses for which Western medicine had little historical knowledge or method of treatment. Since arriving in India in the late fifteenth century, in fact, the Portuguese had relied on local drugs and methods to treat diseases of the region. Thus, even at the booming height of *Goa Dourada*, when the colonial medical hierarchy was firmly in the hands of Europeans, an incipient hybrid medical culture was developing. However, during the period in question, once Goa's golden age had passed and high-placed native healers represented a new influx of indigenous practice to Portuguese health institutions, the hybridisation of Indo-Portuguese colonial medical culture reached its highest stage of development.

Goan-born practitioners in the early-modern state medical institutions of Goa, Daman and Diu were products of a hybrid Indo-Portuguese social culture; thus, they brought a culturally dualistic outlook to the medicine they applied in the Portuguese service. In the most elevated posts – physicians and surgeons assigned to the *Hospital Militar* – Goan medical practitioners tended to be high-caste Christians of established Indo-Portuguese families; either *descendentes* (mixed-blood) or native Christian converts of long standing in Indo-Portuguese society. Hence, their training as healers reflected exposure to indigenous systems of medicine – both local popular medicine practiced among Konkani-speaking Goans, and the older, codified system of Ayurveda known to *vaidyās* along the Malabar Coast. Native Goans in lower-profile posts – some pharmacists, pharmacist's assistants, attending nurses (*enfermeiros*) and assistant surgeons – might have been of less prominent lineage – which only tended

to increase their exposure to undiluted popular indigenous healing culture (as well as its ayurvedic influences) during their formative years.

Health care facilities in Portuguese India in the seventeenth and eighteenth centuries were limited by three main factors: strained economic resources (because commerce had dwindled and the Portuguese national attention had turned largely to Brazil), extreme distance from the metropole, and by a lack of medical personnel formally trained in the Western empirical tradition. However, unlike medical practices in British India that, prior to the modern period, tended to exclude indigenous knowledge and practitioners, Portuguese colonial medical facilities benefited, of necessity, from a rich fountain of local medicinal lore.

In the Portuguese colonies, in sharp contrast to the prejudices that shaped medical practice in the English (and, to a lesser extent, the Dutch and French) colonial holdings in south India, there was much greater diffusion of indigenous medical knowledge. Goan medical institutions countenanced high levels of borrowing and direct copying of local healing methods for maladies encountered in the tropics. Due in part to the participation of native-born healers in colonial health care, Goan medical institutions saw a widespread absorption of Indian techniques. By the middle of the seventeenth century, Indian healing techniques had entered and become firmly embedded in the Portuguese colonial medical lexicon.

Why did this occur? One basic reason was a lack of alternative forms of treatment. European medical tradition provided no other superior means to treat most tropical diseases – the Portuguese certainly had had no prior experience with many of the diseases they encountered in their tropical colonies. Further, Western “science” of the pre-modern period was often no better than time-tested local practices. As the Portuguese became established on the Malabar Coast, it was quite natural, therefore, that the medical traditions of that coast – including many ayurvedic-based traditions – would form the foundation of much of what Portuguese medicine absorbed.

Other reasons include what the Portuguese call *falta de condições*, or “lack of conditions”. Human and material resources available in the colonies, particularly for medical matters, frequently failed to keep up with

demand. Administrative correspondence between the metropole and Goa makes the chronic, acute need for personnel very clear. For example, in a letter of 24 March 1695, the Secretary of State in Lisbon wrote to the Portuguese Viceroy in Goa, outlining a plan to send “one or two” trained physicians from the University of Coimbra who could “cure and teach medicine.” Nearly a century later, another Portuguese Secretary of State, Martinho de Melo e Castro, addressed essentially the same problem, citing the difficulty in finding a physician in Portugal who was willing to be sent to Goa to teach Western medicine. In a letter written on 8 February 1779, Martinho de Melo e Castro encouraged the Governor of the *Estado da Índia* to build his corps of healers locally; he directed the Governor to “promote by all means possible” the training of Indian natives, “with schools of medicine and surgery, and with practice in hospitals.” In his reply, the Governor of the *Estado da Índia* agreed to put this order into effect *promptamente*.

Then, too, a general abundance of local Goan healers, many of whom found their way into Portuguese service, made the widespread use of indigenous medicine in Goa’s medical institutions almost a forgone conclusion. Official correspondence from the *Estado da Índia*’s archives provides clues to this dynamic. For example, in 1687, the local director (*provincial*) of the monastery of Madre de Deus wrote a letter to the Portuguese Viceroy in India, citing examples of service and aid provided by Hindu healers in his region during times of epidemic disease. The *provincial* recounted numerous episodes when *vaidyas* had served alongside his ecclesiastical brethren in the hospitals and infirmaries of Mormugão (south Goa), and reminded the Viceroy that Hindus had contributed to Portuguese efforts from the beginning of the colonial period. On the strength of these contributions, the *provincial* advocated that the colonial government continue to formally cultivate native healing talents.

Later colonial officials, facing similar shortages of medical personnel, wrote letters to the Governor General in Panjim, complaining that there were no European doctors. In a letter dated 20 August 1742, an advocate for keeping the Royal Military Hospital in Old Goa and not moving it to supposedly healthier ground in Panjim, wrote to the Governor

of the *Estado da Índia* to make his case. He described the poor conditions under which the hospital staff lived, often lodging in the hospital building itself. This supplicant claimed that the staff of the hospital pharmacy alone numbered twenty-five to thirty persons, most of whom were either slaves or native-born pharmacist's assistants. The letter also described how a Portuguese military officer who commanded the fortress of Rachol in south Goa had, due to the distance of his post from the Royal Hospital, created his own medical facility and paid for it out of his own pocket. This officer, the Count of Sandomil, had managed to hire a Portuguese surgeon to care for his troops, but the pharmacist of his "hospital" – the man responsible for acquiring drugs and formulating remedies – was a Goan.

In addition, simple demographics in the *Estado da Índia* favoured local healers and their traditional techniques. Because the absolute number of white Europeans of *any* profession or social position immigrating annually to India had fallen so drastically by the late seventeenth century, there were never more than a relative handful of whites in Portuguese India at any given time. This situation lasted until the end of the Portuguese colonial era in the twentieth century.

Moreover, those Europeans who did arrive in Goa, Damão and Diu between 1680 and 1830 tended overwhelmingly to be unskilled soldiers, or officers of the military garrison – very few were trained in any profession whatsoever, let alone medicine. Tropical diseases carried off hundreds of Europeans every year, but left the Indian-born elements of the Goan population intact. Population and casualty statistics remanded annually to the *Conselho Ultramarino* portray a picture of colonial society in Portuguese India that, while heavily christianised, typically contained a European-born contingent of well under two percent. In all of Portuguese India during this period, the number of European-trained physicians and surgeons rarely rose above a dozen; more typically they could be counted on one hand. Under such circumstances, the general population's need for reliance on indigenous healers and their country medicines was manifest.

Indian Ayurvedic Medicinal Plants Frequently Employed in the Portuguese Pharmacies, Hospitals and Infirmarys of Goa (1650-1830)

At this point, we will shift our focus toward the indigenous drugs found to be in use in Indo-Portuguese medical institutions between 1650 and 1830. First, it will be instructive to consider what the term *droga* (“drug”) connoted to the early-modern Portuguese mind. It was a word of great imprecision, having a much broader meaning than simply “drug” as it is understood today. The word included medicinal substances derived from animals or plants, but covered consumer goods like spices, dye woods, and tobacco, as well. Resins, gums, oils, balsams, and roots: all were categorized as *drogas* on the manifests of merchant ships of the *Carreira da Índia*. The term did not intentionally attribute medicinal qualities to substances of little or no medical efficacy – that is a pitfall of a modern reader. Rather, the word meant any substance, which in the early modern period was of potential use as a medicinal ingredient.

That medicinal plants and animal-based drugs from India (and China, as well) were present in urban Portuguese pharmacies from the early sixteenth century is well known. And, thanks to overland trade through the eastern Mediterranean, many Asian medicinal compounds were known throughout Europe even during the days of the Roman Empire. However, if evidence from early-modern medical guides, or *pharmacopea*, are to be believed, eastern drugs were neither widely understood nor commonly utilized by doctors and surgeons in Portugal until the late eighteenth century. That is, despite some exotic eastern remedies being employed to treat specific maladies in Lisbon, Coimbra and Oporto (often by wealthy individuals without seeking direction from a licensed doctor), a broader appreciation of eastern drugs and techniques did not gain acceptance in continental Portuguese medical culture until well into the modern period.

Among the diverse substances found in use in the pharmacies and hospitals of Portuguese Asia in the seventeenth and eighteenth centuries, several stand out for their commonplace nature. Others are more exotic. Prominent on the list were the following *drogas*, the recommended

medicinal uses for which are to be found in several contemporary Portuguese *farmacopeias*, including Dom Caetano's *Pharmacopea Lusitana Aumentada*, first published in Lisbon in 1725, with a revised edition appearing in 1754. Together, they give a good general overview of the type of substances the Portuguese obtained for medical applications in their Asian colonial holdings.

What follows is a brief catalogue of just some of the typical indigenous plant substances utilized in the hospitals and infirmaries of Portuguese India between 1680 and 1830. Each of these substances was also commonly employed in contemporary ayurvedic medicine, as well as other indigenous medical systems of the Malabar Coast. Because of the hybrid nature peculiar to Indo-Portuguese colonial medical culture, in official state medical installations these drugs were being applied to counteract the same general maladies or symptoms for which classical Ayurveda would prescribe them.

- Aloe / *Aloé* (also known as *azebre*): the general name for the sap of diverse species of genus *Aloe*, found in the environs of India, on the island of Socotra (at the mouth of the Gulf of Aden), and near the Cape of Good Hope. In Europe it was used in concert with other drugs for the mixture of medicinal plasters or poultices, or as a topical external ointment. The substance was also attributed with powers as a purgative to clear the bowels or emetic to induce vomiting; it was further employed topically as a cooling agent to treat fevers. This latter use was taken directly from Indian practice: native healers on the Malabar Coast employed the fresh pulp of aloe leaves as a cooling compress. Aloe was also incorporated into commercial preparations available in Lisbon. One example was the "Balsam of Doctor Francisco de Mesquita", prepared with aloe, myrrh and other incense, and was much recommended for "diverse ends." A similar formula, but more complex, constituted the base of a commercial preparation

known as "cordial pills," in which the myrrh and aloe were said to impede the "corruption of the humours."

- *Althea* / *Alteia*: a plant kindered to *Malva* (mallow), also known as "marsh mallow." A small shrub, occurring all over India as a common weed. Much disagreement over several types of plants this might be. Uses: as an aphrodisiac and to increase sexual potency (seeds); in combination with ginger (decoction) for certain fevers; the powdered root bark of *Althea* was given with milk to women for nervous disorders; the root juice was used topically to help heal wounds. A dose of *althea* was a common daily treatment in some Indo-Portuguese healing facilities in the middle of the eighteenth century.
- *Asafoetida* / *Assafétida*: a preparation made from the leaves and gum resin obtained from crushing parings from the roots of diverse plants of the genus *Ferula*, which was native to the Persian Gulf and adjoining regions. This plant was used popularly as an agent to ward off evil spirits. Contemporary usage often combined this plant with *arruda*, known in English as the herb rue. Trained and licensed European *médicos* recommended *assafétida* as an anti-spasm agent, an aphrodisiac (in India), an aperitif to stimulate the appetite and as a treatment for hysteria. To address the latter malady, pharmacists incorporated this drug into pills which became known in Portugal as *pilac hystericæ*; the same substance appears in Caetano de Santo António's *Pharmacopea Lusitana Reformada* (1711) as part of a *bálsamo uterino*, intended to address pain and psychological stress associated with menstruation.
- *Benzoin* / *Benjoim*: (also known as *Assadulcis*): this balsam or salve was made from sap obtained through incisions

cut in the trunk of the *Styrax benzoim*, which is a native plant of Sumatra and eastern India. In Europe it was often used as a perfume or an anti-septic, a quality for which it was prized and for which therefore this substance was often added to other preparations. The raw sap could also be dried into a powder for transport and then mixed into a balm once it arrived in Europe. In India, where it was very abundant, according to de Orta, eating it was thought to strengthen the limbs and calm stomach disorders.

- Cardamom / *Cardamomo*: a common medicinal plant that grows wild in south India and long known to Ayurveda and other indigenous healing systems. The drug consists of the dried fruits and seeds of the plant. Often used in combination with cloves, ginger or caraway seeds, it is good for indigestion, or administered with a purgative to relieve digestive problems.

- Cashew *Feni* / *Aguardente de Caju*: a medicine, the basis of which was a fermented or distilled beverage made from the fruit of the cashew tree, administered as an infusion and decoction. *Feni* was also served in hospitals as a heated medicinal beverage. The Portuguese, of course, introduced cashew trees into India from Brazil, but indigenous medicine along the Malabar Coast soon embraced “cashew wine” and spirits as a pain killer, decongestant, and for relief of respiratory ailments. This is a clear instance, then, when Portuguese practice added to the medical lexicon of Konkani speaking peoples in Goa.

- Cinnamon / *Canela*: typically thought of today only as a food condiment, in antiquity this plant was also credited with curative qualities. This *droga* was prepared from the husk or shell of the cinnamon plant, a native of Ceylon (modern Sri

Lanka) and the Malabar (West Indian) coast. In the seventeenth and eighteenth centuries, cinnamon was used as a stimulant and as an agent to calm nervous stomachs. It was much sought as a stimulative tonic and aphrodisiac, and also used, of course, as a food additive, or as a spice in soured wine. The plant was ground into powders, used as a base for perfumed oils, combined with other substances in solutions, or sold as a dried plant cutting which was then soaked in a beverage or medicine.

- Cloves / *Cravos*: dried flower buds of a tree kindered to that called in Hindi *jambu* or *jambul*, a large evergreen found in humid, deciduous forests in Kerala and Goa. Cultivated by natives and colonists alike, cloves were common along water channels. Uses: anti-nausea and vomiting; indigestion; a stimulant; antiseptic and preservative (clove oil); antispasmodic; and carminative.
- Colocynth / *Coloquíntidas* (also known as *maçã-coloquíntida*): this drug was a derivative of an apple-like fruit creeper, a native to the southern Chinese coast. It was generally employed as a laxative or purgative. The preferred method of application was in a topical poultice, the plant having been ground into a pulp, or an extract of the fruit mixed into a liquid solution.
- Ginger / *Gengibre*: a “universal remedy,” according to classical Ayurveda. This plant is widely cultivated throughout south India and has been central to ayurvedic principles long before the arrival of the Europeans. As an acrid, heat-inducing food, it was valued as an anti-rheumatic, carminative, diuretic and aphrodisiac. Ginger root, dried and powdered, is thought to cure cardiac disorders, stop vomiting and coughing, and help liver inflammation. It addresses such

conditions as constipation, fever, swelling, flatulence and colic. Ginger is also applied to stop diarrhoea, to treat cholera, for dyspepsia and to cure eye diseases.

- Opium / *Ópio*: cultivated in India for medicinal purposes since at least the fifteenth century, opium, sometimes called *anfião*, found a niche in ayurvedic practices. Useful as a strong painkiller and sedative, it was also a popular aphrodisiac. Garcia de Orta was well aware of the addictive dangers of this drug, but described its attraction and value as an item of trade. In Portuguese hospitals and infirmaries of the eighteenth and early nineteenth centuries, opium was sometimes administered mixed with wine, or as a component of the alcoholic tincture of laudanum.

- Pepper / *Pimenta*^{*}: originally from Malabar Coast and later on from the spice archipelagos of the Pacific Ocean, this *droga*, like cinnamon above, was a food condiment but also credited with medicinal powers. Used as a tonic or general stimulant, this plant also was employed as an aperitif to stimulate the appetite, and as an aid to digestion. Popularly, it was considered an aphrodisiac, or at least as an agent to attract the affection of a desired mate. Typically, pepper was ground into a powder, but it also formed the base of medicinal oils, unguents or syrups, or as an ingredient in specially-prepared *águas*.

- Rhubarb / *Ruibarbo*: a tall herb with very stout stems and roots; found at high altitudes in the Himalayas in Kashmir,

* *Pimenta* is the Portuguese name for common pepper (*Piper nigrum*, L. Piperaceae) and *pimento* the Portuguese name for *Capsicum annuum*, L., Solanaceae, not to be confused with *pimenta* in English, which is one of the vernacular names for *Pimenta dioica*, (L.) Merr., Myrtaceae, also called *allspice* and *Jamaica pepper*. [Revisor's note]

Punjab, Uttar Pradesh and Nepal. Valued for its healing properties all over India; hence especially cultivated. Very expensive to gather and distribute. Uses: as a purgative, but the plant has tannins, which act as an astringent, causing constipation after the purging effect. Therefore, rhubarb was an effective agent both against constipation and diarrhoea.

- Sandalwood / *Sândalo*: a middle-sized evergreen tree, common in the Deccan Peninsula, called *candana* in Sanskrit and most of Indian languages. The oil of the plant, as well as ground, powdered wood, is considered medicinal. Uses: (oil) dysuria (urinary tract problems or difficulty in urination); bladder infection; gonorrhoea; cough; tuberculosis and other respiratory ills; gall bladder ailments. Seed oil of sandalwood is considered a treatment for skin diseases. (wood pulp/paste): used in a poultice for inflammations, fevers and skin diseases.
- Sarsaparilla / *Salsaparilha*: a perennial climbing vine that is found throughout India, ayurvedic healers have long employed this plant drug as a substitute for true sarsaparilla. The woody root, powdered and mixed with water or other plant juice, constitutes the drug. Sarsaparilla is useful as a fever reducer and anti-rheumatic; it can also be used to treat skin diseases, syphilis, and urinary disorders. Finally, ingested, its diuretic effect was used to purify the blood.
- Tamarind / *Tamarindo*: a pulp made of the body and seedpod of the tamarind plant, a leafy tree of the tropics. Alternatively, this preparation could consist of the stems, roots and bark of the plant, reduced to a consistent paste. As a medicine, it was used for its qualities as a digestive, as a laxative, and to reduce fever. *Tamarindo* paste was often mixed with other plants. It is rich in organic acids (citric and tartaric), as well as sugars and pectins. This preparation was

also a common ingredient in medicinal *águas*, preserves and syrups.

- *Zedoary / Zedoária*: root of the *Curcuma zedoaria*, originating in India and the Molucca islands. Associated with the root of *angélica* and diluted in vinegar, this plant was used to perfume the mouth during times of plague or epidemic, or to ward off disease. This bitter substance may also have been used in a balm, together with licorice and gentian, to soothe and protect burns or to deflect the evil eye. The drug was also considered a stimulant and an anti-spasmodic. The contemporary use in seventeenth-century Lisbon was to mix this drug with other plants in diverse formulas, the best known of which was called *Água Epidémica* or the *Acctum Pestilentiale*, a solution with a vinegar base.

Indigenous medical influences, it is important to realise, also entered official health institutions through long-established procurement practices. Portuguese pharmacies and hospitals often purchased their medicinal plant preparations and compounds directly from Hindu merchants who specialised in supplying just such goods to the indigenous healing community, as well. This was particularly true of hard-to-find traditional herbal or plant medicines that had to be shipped from distant parts of India.

For example, during the suppression of the Jesuit fraternal religious order in Goa in 1760, part of the value of their confiscated goods was awarded to Hindu merchant Suba Camotim Mamay. At least part of this payment covered consignments of medicinal plants destined to the Jesuits' pharmacy, hospital and infirmaries. Further evidence of Hindu merchants providing regular deliveries of indigenous medicinal substances to Portuguese-run medical institutions can be found in the financial records of the *Convento de Nossa Senhora da Graça*. In 1798 and 1799, two Hindu pharmacists, Rama Chandra Camotim and Segunam Camotim, received very large cash sums for medicines and services rendered to the *Graça*

Convent Hospital. Such disbursements can be found into the following century, and there are even records in 1807 referring to disbursements made to surgeons and pharmacists with Hindu names.

Conclusions

By the late seventeenth century, Portuguese healing practices in India made free use of medical techniques learned from traditional indigenous healing methods of the Malabar Coast.

Portuguese practices echo and emulate healing techniques and remedies found in classical Ayurveda, as well as other local traditional folk medicine systems found in their colonial enclaves.

By the early eighteenth century, Portuguese medical practice in Goa had assumed a stable state of steady hybridisation, mixing drugs and techniques from tropical colonies in Africa, South America, China and southeast Asia with Indian methods, as well as Western innovations brought from Europe.

Well into the 1830's, pharmacists in Portuguese India were commonly prescribing local medicinal plants mixed in preparations with medicines common to Portugal, as they had been doing for three hundred years. Documentation from colonial hospitals, pharmacies and infirmaries are replete with references to Indian and Asian plants – cinnamon, camphor, benzoin, opium – not applied scientifically, necessarily, but having become an absolutely standard part of the pharmacists' medicinal lexicon.

Portuguese healing in the colonies was far more eclectic and experimental – open to indigenous Indian practices because of their demonstrated effectiveness – than were medical practices in continental Portugal. For a variety of reasons having to do with severely limited resources and frequent, sustained exposure to indigenous methods, Indo-Portuguese colonial medical practice was more pragmatic.

Portuguese and indigenous traders in medicinal substances spread Indian medical knowledge around the *Estado da Índia*, as well as to Brazil, Africa and Europe.

For all its appropriation of indigenous medical knowledge and respect for the efficacy of Indian healing techniques, the *application* of those techniques remained, under the Portuguese, essentially Western in its outlook – attempting to isolate medicines to be administered against specific symptoms or illnesses.

Portuguese medical practice in colonial India, therefore, did not absorb the essential philosophical character of ayurvedic methodology, which was comprehensive as a system in its approach to total physical and spiritual health, and encompassed not just applied medicines, but also diet and meditation for total well-being.

BIBLIOGRAPHY

Manuscript Sources (Historical Archives of Goa):

HAG *Monções do Reino* 46A (1682)

HAG *Monções do Reino* 52 (1686-1688)

HAG *Monções do Reino* 59 (1681-1699)

HAG *Monções do Reino* 159C (1778-1780)

HAG *Monções do Reino* 169A (1786-1788)

HAG *Monções do Reino* 175 (1792-1794)

HAG *Monções do Reino* 177A (1796-1798)

HAG *Monções do Reino* 178A (1797-1799)

HAG *Monções do Reino* 178B (1798-1799)

HAG *Monções do Reino* 179A (1801)

HAG *Monções do Reino* 179B (1798-1802)

HAG *Monções do Reino* 181A (1802)

HAG *Monções do Reino* 183A (1803)

HAG Volume 831: *Livro da Receita e Despesa de Medicamentos do Hospital do Convento de São João de Deus* (1733-1737)

HAG Volume 1429: *Regimentos e Instruções* (1737)

HAG Volume 1736: *Lista dos Títulos dos Bens... do Confisco* (1770-1778)

HAG Volume 4504: *Contas da Congregação do Oratório* (1763-1773)

HAG Volume 4508: *Pessoal do Real Hospital Militar* (1777-1779)

HAG Volume 7795: *Livro das Posturas* (1618)

HAG Volume 7887: *Despesas do Convento de São João de Deus* (1759)

HAG Volume 7890: *Contas da Botica do Convento da Madre de Deus* (1799)

HAG Volume 7926: *Provisões de Diu* (1784-1786)

HAG Volume 8030: *Botica do Convento do Santo Agostinho* (1815)

HAG Volume 8031: *Despezas/Dívidas do Convento de Nossa Senhora da Graça* (1798-1835)

HAG Volume 8032: *Botica do Convento de Santo Agostinho* (1830-1835)

HAG Volume 9477: *Despezas do Convento da Graça* (1726-1733)

Secondary Sources:

Amaro, Ana Maria, *A Introdução da Medicina Ocidental em Macau e as Receitas de Segredo da Botica do Colégio de São Paulo*. Macao, Instituto Cultural de Macau, 1992.

Araújo, Maria Benedita, *A Medicina Popular e a Magia no Sul de Portugal*. Unpublished doctoral dissertation of the Universidade de Lisboa, Faculdade de Letras, 1988.

Arnold, David, *Science, Technology and Medicine in Colonial India. The New Cambridge History of India*, Vol. III, No. 5. Cambridge, Cambridge University Press, 2000.

Idem (ed.), *Imperial Medicine and Indigenous Societies*. New Delhi, Oxford University Press, 1989.

Idem (ed.), *Warm Climates and Western Medicine: The Emergence of Tropical Medicine, 1500-1900*. Amsterdam, Editions Rodopi, 1996.

Azevedo, Frei Manuel, *Correcçam de Abusos*. Lisboa, 1680.

Bagchi, Asoke K., *Medicine in Medieval India, 11th to 18th Centuries*. Delhi, Konark Publishers, 1997.

Barreto, J. R. dos Remédios, *Plantas Medicinais de Goa*. Bastorá, Rangel Press, 1959.

Birdwood, G. T., *Practical Bazaar Medicines*. New Delhi, Asian Educational Services, 1999. [Reprint of 1936 edition]

Boxer, Charles R., *Portuguese India in the Mid-Seventeenth Century*. Delhi, Oxford University Press, 1980.

Boxer, Charles R., *Race Relations in the Portuguese Colonial Empire, 1415-1825*. Oxford, Clarendon Press, 1963.

Brás, Luís de Abreu, Portugal Médico. Coimbra, 1726.

Burton, Richard F., *Goa and the Blue Mountains; or, Six Months of Sick Leave*. New Delhi, Asia Educational Services, 1998. [Reprint of 1851 London edition]

Correia-Afonso, John, *Indo-Portuguese History; Sources and Problems*. Bombay, Oxford University Press, 1981.

Correia, A. C. Germano da Silva, *História do Ensino Médico na Índia Portuguesa nos Séculos XVII, XVIII e XIX*. Bastorá, Rangel Press, 1941.

Costa, Cristovam da, *Tratado das Drogas e Medicinas das Índias Orientais*. Lisboa, Junta de Investigações do Ultramar, 1964.

De Orta, Garcia, *Colloquies on the Simples and Drugs of India*. Translated by Clements R. Markham. Delhi, Sri Satguru Publications; Indian Medical Science Series No. 5, 1987. [Reprint of 1913 London edition]

De Orta, Garcia, *Coloquios dos Simples e Drogas e cousas medicinais da Índia...* Goa, 1563. [facsimile edition, Lisboa, Academia das Ciências de Lisboa, 1963]

Dahanukar, Sharadini and Urmila Thatte, *Ayurveda Unravellled*. New Delhi, National Book Trust, 1996.

Dalgado, Sebastião Rodolfo. *Glossário Luso-Asiático*, New Delhi, Asian Educational Services, 1988. [Reprint of 1921 Lisbon edition]

Dash, Vaidya Bhagwan and Acarya Manfred M. Junius, A *Handbook of Ayurveda*. New Delhi, Concept Publishing Company, 1997.

Dias, José Pedro Sousa, *Inovação Técnica e Sociedade na Farmácia da Lisboa Setecentista*. Unpublished doctoral dissertation of the Universidade de Lisboa, Faculdade de Farmácia, 1991.

Idem, “Bibliografia sobre a Farmácia e a Matéria Médica da Expansão e da Colonização Portuguesa (Séculos XVI a XVIII), in *Mare Liberum*, 11-12 (Jan./Dec. 1996), pp. 165-207.

Idem, “O Odor e o Sabor da Farmacologia Galénica” in Inácio Guerreiro (ed.), *A Epopeia das Especiarias*. Lisboa. Instituto de Investigação Científica Tropical and Edições INAPA, 1999, pp. 90-103.

Figueiredo, João Manuel Pacheco de, “The Practice of Indian Medicine in Goa During the Portuguese Rule, 1510-1699,” in *The Luso-Brazilian Review*, Vol. IV, No. 1 (June, 1967), pp. 48-56.

Idem, “Contribuição de Portugal para a medicina no Oriente nos séculos XVI, XVII e XVIII” in *Arquivos da Escola Médico-Cirúrgica de Goa*. Bastorá, Rangel Press, 1960.

Idem, “Escola Médico-Cirúrgica de Goa: Esboço Histórico” in *Arquivos da Escola Médico-Cirúrgica de Goa*. Bastorá, Rangel Press, 1960.

Figueiredo, John M. de, "Ayurvedic Medicine in Goa According to European Sources in the Sixteenth and Seventeenth Centuries." *Bulletin of the History of Medicine*, Vol. 58, No. 2 (Summer 1984), pp. 225-235.

Frada, João, "Contributos Portugueses do Período Expansionista e da Época Colonial para as Ciências Médicas," in *Medicamento, história e sociedade* (Ano 4, Nr. 6; Julho 1995), pp. 8-14.

Fonseca, José Nicolau da, *An Historical and Archaeological Sketch of the City of Goa*. New Delhi, Asia Educational Services, 1994. [Reprint of 1878 Bombay edition]

Gaitonde, P. D., *Portuguese Pioneers in India; Spotlight on Medicine*. Bombay, Popular Prakashan Private, 1983.

Gaitonde, Rudraji Vishvanath, *Pharmacognostic Study of Some Medicinal Plants from Goa*. Unpublished Ph.D. Dissertation, College of Pharmacy, University of Goa, 1988.

Gomes, Maria Bernadette, *Ethnomedicine and Healing Practices in Goa*. Unpublished Ph. D. Dissertation, Department of Sociology, University of Goa, 1993.

Gracias, Fátima da Silva, *Health and Hygiene in Colonial Goa, 1510-1961*. New Delhi, Concept Publishing, 1994.

Gracias, J. B. Amâncio, *Médicos Europeus em Goa e nas Cortes Indianas nos séculos XVI-XVIII*. Bastorá, Rangel Press, 1939.

Harrison, Mark, *Climates and Constitutions; Health, Race, Environmentalism and British Imperialism in India, 1600-1850*. New Delhi, Oxford University Press, 1999.

Jain, S. K., *Medicinal Plants*. New Delhi, National Book Trust, 1999.

Kakar, Sudhir, *Shamans, Mystics and Doctors. A Psychological Inquiry into India and Its Healing Traditions*, 6th ed., New Delhi, Oxford University Press, 2000.

Kumar, A. Vinaya, *Ayurvedic Clinical Medicine*. Indian Medical Science Series No. 60. Delhi, Sri Satguru Publications, 1997.

Madhavankutty, K., (ed.), *Drugs Used In Tribal Medicine in Kerala*. Thiruvananthapuram, Kerala Association for Non-Formal Education and Development, 1989.

Nadkarni, K. M., *Indian Materia Medica; with Ayurvedic, Unani-Tibbi, Siddha, Allopathic, Homeopathic, Naturopathic and Home Remedies*. Mumbai, Popular Prakashan, 2000. [Reprint of Third Revised and Enlarged edition, by A. K. Nadkarni, 1954]

Noronha, António da Piedade, “Certos fármacos vegetais de Goa e a sua importância na terapêutica.” in *Arquivos da Escola Médico-Cirúrgica de Goa*. Bastorá, Rangel Press, 1949.

Patnaik, Naveen, *The Garden of Life: An Introduction to the Healing Plants of India*. London and New Delhi, Aquarian Books, 1993.

Pearson, Michael N., *The Portuguese in India. The New Cambridge History of India*, Vol. I-1. Cambridge, Cambridge University Press, 1990.

Idem , “The Thin End of the Wedge: Medical Relativities as a Paradigm of Early Modern Indian-European Relations” in *Modern Asian Studies*, XXIX, 1, 1995, pp. 141-170.

Idem , “First Contacts between Indian and European Medical Systems: Goa in the Sixteenth Century,” in David Arnold (ed.), *Warm Climates and*

Western Medicine: the Emergence of Tropical Medicine, 1500-1900. Amsterdam, Editions Rodopi, 1996, pp. 20-41.

Peregrino da Costa, P. J., *Contribuição dos médicos da Escola da Goa para o estudo de medicina tropical...* Bastorá, Rangel Press, 1960.

Idem, *A Escola Médica de Goa e a sua projecção na Índia Portuguesa e no Ultramar.* Bastorá, Rangel Press, 1956.

Pina, Luís de, *Subsídios para História da Medicina Portuguesa Indiana do século XVII.* Porto, s. ed., 1931.

Pinto, Celsa, “Goa-Based Overseas and Coastal Trade; 18th and 19th Centuries” in Teotónio de Souza, ed., *Goa Through the Ages*, Vol. II, *An Economic History*. New Delhi, Concept Publishing Company, 1990, pp. 176-212.

Idem, *Trade and Finance in Portuguese India; A Study of the Portuguese Country Trade, 1770-1840.* Xavier Centre of Historical Research Series No. 5. New Delhi, Concept Publishing Company, 1994.

Pita, João Rui, “A quina e outras drogas americanas na produção medicamentosa do Hospital da Universidade de Coimbra nos finais do século XVIII” in *Mare Liberum*, 17 (June 1999), pp. 197-228.

Russell-Wood, A. J. R., *A World on the Move: The Portuguese in Africa, Asia and America, 1415-1808.* Manchester, Carcanet Press, 1992.

Santo António, Frei Caetano de, *Pharmacopea Lusitana: Método Prático de Preparar, e Compôr os Medicamentos na Forma Galenica com Todas as Receitas Mais Usuais.* Coimbra, Impressão de João Antunes, 1704.

Idem, *Pharmacopea Lusitana Reformada: Método Prático de Preparar os Medicamentos na Forma Galenica e Chimica*. Lisboa, Impressão no Real Mosteyro de São Vicente de Fóra, 1711.

Idem, *Pharmacopea Bateana*. Lisboa, 1713.

Sivarajan, V. V. and Indira Balachandran, *Ayurvedic Drugs and Their Plant Sources*. New Delhi and Bombay: Oxford and IBH Publishing Co., 1994.

Souza, Teotónio R. de (ed.), *Essays in Goan History* New Delhi, Concept Publishing Company, 1989.

Idem (ed.), *Discoveries, Missionary Expansion and Asian Cultures*. New Delhi, Concept Publishing Company, 1994.

Subrahmanyam, Sanjay, *The Portuguese Empire in Asia, 1500-1700*. London, Longman Press, 1993.

Svoboda, Robert E., *Ayurveda: Life, Health and Longevity*. New Delhi, London and New York, Penguin Books, 1993.

Thomaz, Luís Filipe, “O Nome das Especiarias” in Inácio Guerreiro (ed.), *A Epopeia das Especiarias*. Lisboa, Instituto de Investigação Científica Tropical and Edições INAPA, 1999, pp. 8-41.

Varde, P. S., *History of Education in Goa from 1510 to the Present Day*. Panaji, Goa Vidya Pratishthan, 1977.

Walker, Timothy. “Doctors, Folk Medicine and the Inquisition: the Repression of Popular Healing in Portugal during the Enlightenment Era.” Unpublished Ph.D.Thesis. Boston University Graduate School of Arts and Sciences, 2001.

Idem, "Remedies from the *Carreira da Índia*: Asian Influences on Portuguese Medicine during the Age of Enlightenment." College of Charleston: papers of the conference *The Evolution of Portuguese Asia: Quincentenary Reflections*, March 1999.

EVOLUTION OF BASIC PRINCIPLES OF AYURVEDA

P. M.Varier*
Arya Vaidya Sala
Kottakkal

Introduction

The ayurvedic system of health care is said to have its origins in time immemorial. But at the same time the Ayurveda that we understand and practise today is strongly built on a foundation consisting of axiomatic premises, logical development and documented records. It has a rigorous framework of principles and practices. Some of the major documents of ayurvedic principles were written in the last centuries of BC and in the beginning of AD, they have their roots in the *Atharvaveda* and even in the *R̥gveda*, which is recognized as the earliest form of written knowledge. The ancient Indian knowledge has developed as a result of interactions between opposing viewpoints and theories on the world and its inhabitants. Such thoughts gave birth to schemes of human functions and subsequent development of specialized sciences. Ayurveda is one such knowledge scheme. As a living system of knowledge, it has its fundamental axioms deeply rooted in one or two branches of ancient Indian philosophy. An attempt is made here to trace some such roots.

1. Ayurvedic view of life

Ayurveda perceives man as an integral part of nature.¹ They both have fundamental commonalities. Every anguish and distress of man is caused by his ignorance of the body and the mind.² It is this anguish, which

* Dr. Raghunathan helped me while preparing the manuscript.

¹ Agniveśa, *Carakasamhitā*, Śā, 5,3. Varanasi, Chaukhamba Sanskrit Sansthan, 1943, p. 325.

² Idem, *Sū*, 30.84. p. 195.

manifests as a disease. Appropriate and perfect knowledge retrieves man from his anguish.

Ayurveda attempts to understand and explain the human life in its entirety. It may not be completely true to characterize Ayurveda just as a science dealing with the human body and its life. Because, more than a health care system, it happens to be a philosophy of life.

2. The origins

The Indian sages, who had tried to trace the origins of Ayurveda, have come up with the idea that it has been in existence in one form or the other ever since the human race came on the world. Because, it is found to continuously retain its close and comprehensive relation with man and his predicament. The knowledge about man's civilization is as old as the civilization itself. This knowledge base is what is universally known as the Vedas. It is but true that the very same Vedas developed into specialized treatises dealing with specific subjects. These generic and specific Vedas are a veritable collection of knowledge. In latter periods, when the study and interpretations progressed in different directions based on specific modes and traditions of application, the Vedas were got divided into four distinct entities. The four entities are the well known *R̥k*, *Yājus*, *Sama* and *Atharva*. Among them, the *Atharvaveda* contains more frequent references to matters concerning human health. Ayurveda, in fact, is often treated as a sub text of *Atharvaveda*.³

A major component of ayurvedic treatises deals with the use of *materia medica*. The prototypes of several of the ayurvedic methodologies of drug application are seen in *Atharvaveda*. But the ayurvedic methods are advanced considerably from their prototypes both in their scientific framework as well as in their conceptual foundation. Many of the modalities propounded by the *Atharvaveda* are transcendental in nature and akin to faith healing. They are mostly steeped in concepts of supernatural forces

³ Suśruta, *Suśrutasaṃhitā*, Sū, 1.6. 2nd ed. Bombay, Pandurang Jawaji, Nirnayasagar Press, 1931, p. 2.

and otherworldliness. They passed through various stages of evolution before the logic-based and rationalized approach of systematized Ayurveda took shape.

3. The hexa-substance approach (*ṣaḍpadārtha vāda*)

While considering the all pervading fundamental concepts which form the major axiomatic base for a large section of the Indian thought, one of the important concepts that demands attention is the hexa-substance theory. It is mentioned that the great sages who took up the study of the material world thought it fit to categorize the whole set of substances into six groups. Here the term substance refers to matter and its characteristic attributes. These six substances are called the similarity, the dissimilarity, the property, the matter, the function and the non-separableness.⁴ These are collectively known as the hexa-substance group.

The matter is the one which possesses property and function. Matter can give birth to new matter. That is not the case with property and function. They are dependent on the matter and they have existence only as the attributes of matter and they do not themselves give rise to new property and new function. The first two substances indicate that the properties and functions of matter can be similar or dissimilar to other properties and functions. These opposing attributes have great role in the ayurvedic methodologies. They are expanded and applied in Ayurveda while developing the therapeutic groupings of drugs. The last substance, that is, the inseparableness, describes the close association of property and function with matter.

The application of ayurvedic *materia medica* is extensively based on this hexa-substance theory. A material has its properties. Taking into account the similarities and dissimilarities of the material properties in comparison to the constitutional and conditional characteristics of the patient, a material proves useful or not for dealing with a condition of

⁴ Agniveśa, *Carakasamhitā*, Sū, 1.28-29. Varanasi, Chaukhamba Sanskrit Sansthan, 1941, p. 7.

ailment. The factor which is responsible for causing an effect on the disease is the functional attribute of the material. Thus, it is the properties and functions of a material, which decide its utility as a medicament.

4. Similar and dissimilar aspects of matter

One basic aspect of the ayurvedic method of treatment involves identifying characteristics of materials, which are similar and dissimilar to the characteristics of both the constitutional and ailment conditions. There are characteristics or properties which are similar with the ailment character. The application of such a material will act in an additive fashion on the ailment condition. That condition will, thus, aggravate. It is but natural that interaction between materials possessing characteristics which are similar to each other will result in its enhancement. Conversely, dissimilar characteristics will inhibit its growth.⁵

The ayurvedic method makes use of this simple theory with remarkable efficacy for supplementing those human attributes which are deficient and also for trimming the abundant attributes in such a manner that the constitutional characteristic is maintained at a state of dynamic equilibrium. Removal of morbidity and building up health are achieved largely by the appropriate application of this principle. The recommended intake of blood for dealing with severe conditions of anemia is a rather simplistic example for this approach. Similarly, disease causing excesses in the body are corrected by the administration of materials possessing properties of depletion. The application of additive and reductive functions of similar and dissimilar properties of matter is an integral component of ayurvedic therapeutic approach.

5. The universe and the man

For achieving effective use of this principle, there needs to establish clear definitions of the properties and functions of every

⁵ Idem, 1.44. p. 8.

component of the human body as well as that of the external universe. Human being is an appropriate blend of the body, the mind, the sensory organs and the soul, as per the ayurvedic philosophy. It is stressed that an intelligent man is the one who can recognize the aspects of the cosmos in man and vice versa. Several of the attributes of universe are perceived in man. That is why the human being is often described as the microcosm of the macrocosm. There are six distinct seasons which result in apparent changes in the environment. Sage Suśruta says that there are similar six changes taking place in man on each day.⁶ Every change occurring in the universe is reflected in man. The rain, the wind, the lightning, the mist and every other manifestation of environmental changes have their miniature parallels in human body. And this is taken to indicate that there are commonalities in the constitutional aspects of the universe and the man. The *tri-guṇa* theory, that is the tri-character theory, which is a universally accepted view of man and his surroundings in Indian thought, is a natural offshoot of this understanding.

6. The three basic characters

The Indian concept of the Universe attributes two aspects to it. One is manifest and clear and the other un-manifest, diffused and unclear. Daytime represents the former and nighttime the latter.⁷ The manifest world gets perceived and understood and becomes clearer and more defined in three forms. They are the three basic characters. These three basic characters refer to (a) *rajas* which is responsible for creation, (b) *tamas* which is responsible for annihilation and (c) *sattva* which maintains a balance between the two. These three fundamental characters can be termed as the vigorous, the base and the sublime respectively. The whole world is the manifestation of the combination of these three characters in

⁶ Suśruta, *Suśrutasaṃhitā*, Sū, 6.15. 2nd ed. Bombay, Pandurang Jawaji, Nirnayasagar Press, 1931, p. 26.

⁷ Vedavyāsa, *Bhagavadgītā*, VII 18. 9th ed.. Trissur, H and C Publishing House, 1996, p. 210.

different proportions. Their respective roles manifest in two major segments. The first segment contains eleven components which have their base in the sensory related attributes of man. They comprise five motor organs, five sensory organs and one motor cum sensory organ, which is identified as the mind. All these eleven components are related to the sublime and the vigorous characters. Whereas, the second segment of ten components has its origin from the vigorous and the base characters. There are five molecular forms of these two characters and their corresponding five *bhūtas*, that is their elementary manifests. These five elements are the macroscopic manifestations of the five microscopic molecules. Man is the combination of these two segments which, as seen above, are the compositional result of the three basic characters. Similarly, every aspect of the universe is also the result of unique blending of these three characters.

All the twenty-one constituents of man can be conceptualized. But what can be perceived as material realities are the five elements (*pañcabhūta*). Suśruta insists that the five elements are nothing but the manifestation of the three characters, just as every other aspect of the living and the inanimate constituents of the universe.⁸ In the case of the Universe, the sublime character is identified with the element of space, the vigorous character with the element of wind, the sublime and vigorous jointly with the fire element, the sublime and base together with the element of water and the base character alone is identified with the element of earth.⁹ Thus, it is seen that not only man but his environment is also associated with the three basic characters in different proportions. It should be mentioned here that the practical aspects of therapy, unlike the foregoing theoretical considerations, take into account the formal manifestations of the five elements rather than the original attributes of the three characters.

⁸ Suśruta, *Suśrutasaṃhitā*, Śā, 1.12-13. 2nd ed. Bombay, Pandurang Jawaji, Nirnayasagar Press, 1931, p. 286.

⁹ Idem, Śā, 1.20, p. 288.

7. The influence of *Sāṃkhya* philosophy

The development of Indian philosophy subsequent to the Vedas is exemplified in six *Darśanas*, viz., *Sāṃkhya*, *Vaiśeṣika*, *Yoga*, *Nyāya*, *Pūrvamīmāṃsā*, and *Vedānta*. Among them, *Sāṃkhya* and *Vaiśeṣika* have contributed extensively to ayurvedic theories and *Yogadarśana* to a lesser extent.

The five primordial element approach is extensively propounded in *Sāṃkhya* philosophy. It talks about a 24-doctrine system. It starts with the indistinct and nebulous original nature which leads to the expansive and lofty principle from which arises the egotism. This egotism is a manifestation of the three basic characters. Subsequently come the eleven sensory and motor organs and finally the five molecular forms and their five elements. All these together form the famous 24-doctrine philosophy of *Sāṃkhya*. When the soul enters this conglomeration of 24 entities, the inanimate body gets energised and becomes a living human being. The first indistinct and un-manifest form is the original source. This original un-manifest form and the remaining 23 manifest forms are seen separate from the soul, because man has the power of life and he has consciousness. Whereas, the other 24 principles are inanimate attributes of the nature.

The amalgamation of the inanimate nature on the one hand and consciousness on the other results in the existence of man. It is this individual having a life of consciousness, who is the target of ayurvedic approach.

8. The role of *Vaiśeṣika* philosophy

The *Vaiśeṣika* philosophy perceives an individual primarily as a manifestation of a unique individual soul. This soul is accompanied by the mind and its supporting structure of the five elements. The temporal and spatial changes influence the human being. The soul, the mind and the five elements of the individual along with the temporal and spatial components are together treated as the nine-matter group by the *Vaiśeṣika* philosophy. Among them the five elements are the only ones which can be perceived by

sensory organs. And they constitute the human body which falls sick and also the *materia medica* which help to treat sickness. The development of the five-element theory of Ayurveda is partly indebted to the *Vaiśeṣika* philosophy.

9. *Yoga* philosophy

Another important branch of Indian thought is the *Yoga* philosophy. But this branch has much less to do with the five-element theory. It talks more about the ways and means of dealing with the human mind. The part of Ayurveda which deals with the health and ill health of mind might have received some inputs from the *Yoga* philosophy.

10. The human body and the five elements

The bodily organs and attributes are categorized as per their correlation with each constituent of the five elements. The five elements are the space, the wind, the fire, the water and the earth. Each one of them wields an influence on a certain part of the human constitution. Every opening in the body, the ears and the voids and internal sounds of the body are all belonging to the element of space. The touch and the skin, and the vibrations, the movements and the activities of the body are dependent on the element of wind. The element of fire influences the human form and its glow, the eyes, the bodily heat, the digestive activity and also the feelings of anger and valour. The element of water causes the taste and the tongue, the bodily fluids, the body cooling, the unctuousness and the semen. Earth, the last element, influences the smell, the nose, the corporality and heaviness.¹⁰

¹⁰ *ibidem*, Śā, 1.19, p. 287.

11. *Materia medica* and the five elements

It has been seen earlier that both the *Sāṃkhya* and *Vaiśeṣika* philosophies have an important commonality in their concept of the five elements and their critical influence on the human body as well as on the external world. The natural extrapolation from this stand is the observation that every medicament, which is originating from the world around, will be under the domain of the theory of five primordial elements. Every organ, aspect and activity of the human body is controlled by a dominating element. When this natural presence is upset due to whatever reason, then complications arise and they manifest as diseases. The objective of therapy will be to replenish whatever element has depleted and to frugalise whatever element has enhanced in such a way to achieve back the original dynamic equilibrium. The application of the additive and reductive functions of the similar and dissimilar qualities for achieving this purpose has been mentioned earlier. The important modality is to identify the particular drug or combination of drugs which possesses the necessary balance of the five elements or properties and to apply them in an appropriate manner. The deciding factor for selecting the right combination of drugs is their elemental constitution.

12. The property based application of drug

There is nothing in the universe that is devoid of the five elements. And the natural corollary is that there is nothing in the universe that cannot act as a therapeutic agent.¹¹ It is mentioned that there are a total of 41 items of properties that are commonly found in the matter. This number is obtained from the five elements and their various manifestations. Every drug belongs to specific grouping of property. In addition to that, the drugs are categorized as per their attributes which are more extensively employed in their therapeutic application. There are five common attributes. They are

¹¹ Agniveśa, *Carakasamhitā*, Sū, 1.49. Varanasi, Chaukhamba Sanskrit Sansthan, 1941, p. 8.

the taste, the property, the potency, the *vipāka* (post digestive state) and the synergy. Polyherbal medicines are formulated by the appropriate mixing of these five attributes.

13. The *tridoṣa* theory

The five-element basis of the human body is the starting point. A condition of ailment caused by erratic alterations of the natural composition of the five elements is set right by the optimum use of materials obtained from the universe which are also composed of the five elements. The sages also observed the changes occurring in the surroundings and found that the three major influencing factors for such changes are the moon, the sun and the wind. And it was postulated that the moon was a moistening agent, the sun was an emaciating agent and that the wind was an agent causing motion. They were respectively conceived as indicating the *kapha* (aggregative factor), the *pitta* (vital heat) and the *vāta* (motive force), respectively.¹² This is the well-known *tridoṣa* theory. This theory is unique to the Ayurveda texts. They don't find any possible origin in the earlier Indian thoughts, but for some very vague allusions in the Vedas.

These three factors are closely related to the five elements. The *vāta* represents a combination of the elements of the space and the wind. The *pitta* represents the fire element, and the *kapha* represents the elements of the water and the earth. The human body and its activities are maintained by retaining an appropriate and optimum balance between these three factors. This balance is unique to each individual and unique even to each and every organ and function of the individual. These three factors are conceived as the three fundamental functional units of the body. Then there are seven structural units known as the *dhātus* and excretory matter for each *dhātu* known as the *malas*. These units together decide the condition of health or ill health of an individual. All these attributes are related to the five primordial elements. At the same time, the major factor of the mind is

¹² Suśruta, *Suśrutasaṃhitā*, Sū, 6.8. 2nd ed.. Bombay, Pandurang Jawaji, Nirnayasagar Press, 1931, p. 25.

not necessarily decided by them. It is the domain of the basic *triguṇas*, that is the sublime, the vigorous and the base characteristics.

Conclusion

An attempt has been made here to take an overview of some of the fundamental principles which have critical influence on the theoretical and practical aspects of the ayurvedic system of health care. The effort has not been an exhaustive one. It is observed that the theories of five elements, three characters and *tridoṣa* have their origins in the later philosophies of *Sāṃkhya* and *Vaiśeṣika*, whereas some of their primordial indications are present in *Atharvaveda* and even in the *R̥gveda*.

A REVIEW OF THE CONCEPT OF *PITTA*

K. Raghunathan

Faridabad

Vāta, *pitta* and *kapha*, collectively termed *tridoṣa* are the primal constituents of the living body. The life processes and vital activities of the human systems and their functioning as an integrated whole are represented by this concept. It is this integrated concept that assumes importance and significance in the physiology and pathogenesis. In short, it is a concept of bio-functional organizations applicable to and operative in health and disease. Critical examination into the etymological derivations of *kāya* highlights the importance of concept of *pitta* in the study and understanding of *Kāya Cikitsā* or rather events and disorders connected with *kāya*. It will be relevant to examine the significance of the usage of the term *kāya*, in place of its synonyms *deha* and *śarīra*. *Kāya* is derived from the root *cīñ-cayane*¹ which means "to collect", and the collection refers to *cīyate annādhibhiḥ*, i.e., collection of food, etc. By corollary it is to be understood that *kāya* takes in food, digests, absorbs and metabolises it. In short, thereby implying *kāya* means building up of the body with food, a metabolic outcome. The theories of digestion and metabolism are based among others on the concept of *pitta*. The terms *deha* and *śarīra*, though synonyms of *kāya*, *kāya cikitsā* is the term used and not *deha cikitsā* or *śarīra cikitsā*. To appreciate the implication of this, it is necessary to look into the roots from which these terms are derived. *Deha* is derived from root *dih-ghinā*² meaning "to grow" or "to develop" which conveys the idea of anabolic process. The *śarīra* derived from the root *śr-īram* meaning *śīryate anena*³ *iti śarīram (prati kṣaṇam kṣīyamāṇo dehe)*⁴ conveys the idea of catabolic process, it has been noted from the earlier etymological study that the term

¹ *Śabdastoma Mahānidhi*

² *Idem*

³ *ibidem*

⁴ Su. *Sūtra*, 21.9; Cakra. On CS. *Sūtra*, 30.27

kāya comprehends the entire process of metabolism. The terms *deha* and *śarīra* speak of anabolic and catabolic processes respectively – each of which independently forms only a part of the entire process of metabolism. *Kāyacikitsā* is concerned with treatment of diseases whose origin is traceable to impaired metabolism, which points to nutrition and factors responsible for digestion, absorption and metabolism, *pari passu* to activities of *antarāgni*.⁵ *Pitta*, which has fiery qualities, is identified as *antarāgni* (internal fire) since it performs *dahana* (burning, oxidation), *pacana* (digestion and subsequent processing of foods) and such other actions as *agni* does. *Pitta* is the fire in the body and there is no other fire but *pitta*. Scriptural evidence also favors the view that there is no other *agni* different from *pitta*.⁶ *Carakasamhitā* indicates *agnireva śarīre pittāntargataḥ*⁷ thereby meaning fire is contained within the *pitta*, and productive of all good and bad qualities – digestion and indigestion, vision and impairment of vision, normality and abnormality of temperature, normal or abnormal complexion, intrepidity and fear, anger and exhilaration, confusion and lucidity and other such duals.⁸ Commenting on this, Cakrapāṇi says *pittāntargata* does not mean *pitta* is flaming fire and only refers to the phenomenon of heat, which is associated with fire *pittosmarūpasya vahneḥ*.⁹ Vāgbhāṭa uses *anala śabda*¹⁰ for *pitta* since it performs *pākādikarma* (processes related to digestion etc.).

Vijayarakṣita, citing Bhoja, mentions of the *tejomayaṃ pittam*¹¹ (incandescent/glowing/radiant) connected with digestive process, hence mentioned as *kāyāgni*, thermal component in the body and vital support to the body. The semblance of *pitta* to *agni* is decipherable through objective functional realities in the human system. To understand the semblance and

⁵ Idem

⁶ *ibidem*

⁷ CS. *Sūtra*, 12.11

⁸ Idem

⁹ CS. *Sūtra*. Cakra. on 12.11

¹⁰ AH. *Sūtra*, 12.11

¹¹ Vijayarakṣita on MN. 55.31

functional identity of *pitta* to *agni*, it is necessary to look into the concept of *pañcabhūta* that is related to all matters – insentient or sentient.¹² The qualities of *bhūtas* are manifested in the constitution and activities of the matter. All matter is composed of five *mahābhūtas* (protoelements), i.e., *pr̥thvī*, *āp*, *tejas*, *vāyu* and *ākāśa*.¹³ The five categories of the physical matter are transformed into three *doṣas* by combination of *pr̥thvī* and *āp* into *kapha*, *ākāśa* and *vāyu* into *vāta* and *agni* alone into *pitta*.¹⁴ This only points to the predominance of a particular *bhūta* component in the *doṣa* and does not rule out the presence of other *bhūtas* – only the proportion varies. The incorporation of the protoelements into the biological forces of the body, i.e., *vāta*, *pitta* and *kapha* explains the basis and nature of activity observed in the human system. In the present study of *pitta* the qualities of *agni bhūta* call for attention. The qualities of *agni* are *rūpa* (vision), *rūpendriya* (visual organ), *varṇa* (complexion), *santāpa* (heat related to body), *bhrājiṣṇutā* (splendour), *pakti* (food digestion), *amarṣa* (indignation), *taikṣṇya* (sharpness) and *śaurya* (valour).¹⁵ One finds that the qualities of *agni* are reflected in *pitta*, and since *pitta* also possesses these qualities its function is akin to *agni*.

Pitta is a broad-based concept connected with a wide range of body activities like digestion, metabolism, heat production, haemopoiesis, visual functioning and higher mental faculties and emotional state. The term *pitta* is derived from the verbal root *tap* meaning "to heat or burn".¹⁶ It has three meanings,¹⁷ viz. (i) *tap santāpe*, meaning "to heat or generate heat" (*tapati uṣmaṇām utpādayatīti pittam*); (ii) *tapa dāhe*, meaning to burn, i.e., burning of ingested food (*tapayate dahati bhukta māhārajātam iti pittam*) (III) *tapa aiśvarye* meaning accomplishment of eight kinds of benefits (*tapayate aṣṭavidhamaṇimādikamaiśvaryamiti pittam*).

¹² CS. *Sūtra*, 26.10

¹³ CS. *Śārīra*, 1.27

¹⁴ AS. *Sūtra*, 20.3

¹⁵ SU. *Śārīra*, 1.19

¹⁶ SU. *Sūtra*, 21.5

¹⁷ *Siddhanta Kaumudī*

These etymological derivations of *pitta* have significant and meaningful import in explaining the various steps involved in the process of digestion, metabolism and transformations. *Pitta* performs *dahana* (burning, combustion, and oxidation) and *pacana* (*pāka*, chemical action). Ḍaḥaṇa interpreted them as *dahanam dāhaḥ* and *pacanam pāka āhārādeḥ*¹⁸ respectively. The term *pāka* is described *pākaḥ pariṇatau* and *pākaḥ parāvṛtti* correspond to digestion and transformation respectively.¹⁹ These terms indicate functions of *śarīrāgni* right from initiation of digestive process to metabolism and conversions and transformations.

Before proceeding further, it is necessary to provide comprehensive picture of location, physical qualities, characteristics, functions of the normal *pitta* and the five kinds of *pitta* and their role in the body activities. Symptoms related to abnormal *pitta* and provocative factors leading to such abnormality are also mentioned.

The location/seat of *pitta* is *hrdayanābhyormadhyabhāga* (mid region of heart and umbilicus). The places of *pitta* again are in the region of *nābhi* (umbilicus), *āmāśaya* (stomach), *sveda* (sweat), *lasikā* (lymph), *rudhira* (blood), *rasa* (nutritive fluid), *dṛk* (eye), *sparsāna* (tactile region, meaning skin) and particularly in *nābhi* (umbilicus).²⁰

The characteristics and innate qualities of *pitta* are *uṣṇa* (heat), *tīkṣṇa* (irritant/sharpness), *dravatva* (fluidity), *nātisncha* (slightly unctuous) having colour other than *śukla* (white) and *aruṇa* (red), *visragandha* (fleshy smell), having *kaṭu* (pungent) and *āmla* (sour), *rasa* (taste) and *sara* (mobility).²¹ Suśruta, Kāśyapa and Vāgbhaṭa mention the same characteristics. Kāśyapa and Vāgbhaṭa in addition added *laghugūṇa* (lightness) as an innate quality of *pitta*.²²

The functions ascribed to *pitta* in the classical treatises, i.e., Caraka, Suśruta and Vāgbhaṭa are enumerated here under:

¹⁸ SU. *Sūtra*. Ḍaḥaṇa on 21.9

¹⁹ *Medinī Kośa - A Lexicon*

²⁰ AH. *Sūtra*, 12.2-3.

²¹ CS. *Sūtra*, 1.60 and 20.15

²² KS. *Sūtra*, 27.40 and AH. *Sūtra*, 1.11

Caraka ascribed functions of *darśana* (visual perception), *pakti* (digestion), *uṣman* (temperature/heat), *kṣut* (hunger), *tṛṣṇā* (thirst), *dhamārdava* (softness of the body), *prabhā* (lustre), *prasāda* (cheerfulness) and *medhā* (intellect).²³

The functions of *pitta* mentioned by Suśruta are *rāga* (colouring), *pakti* (digestion), *ojas* (quintessence of *dhatus*), *tejas* (upholds vision), *medhā* (intellect) and *uṣman* (body temperature).²⁴ The above functions are ascribable to five different manifestations viz., *pācaka pitta*, *rañjaka pitta*, *sādhaka pitta*, *ālocaka pitta* and *bhrājaka pitta*. These will be discussed later.

The functions of *pitta* mentioned by Vāgbhaṭa are *pakti* (promotes digestion), *uṣman* (production and maintenance of body temperature), *kṣut* (causes hunger/appetite), *tṛt* (causes thirst), *ruci* (taste), *prabhā* (confers luster), *medhā* (contributes to intellect), *dhī* (related to courage) and *tanumārdava* (provides softness to the body).²⁵ Although the functions mentioned in three treatises are more or less identical, yet these are listed separately by way of information.

Pitta, with its innate qualities earlier indicated, produces the following symptoms that help in the diagnosis of the disorders of *pitta*. The symptoms are *dāha* (burning), *auṣṇya* (heat), *pāka* (suppuration, inflammation), *sveda* (perspiration), *kleda* (moisture), *koṭha* (sloughing), *kaṇḍu* (itching), *srava* (discharge), *rāga* (redness) along with emanation of smell, colour and taste according to innate nature of *pitta* (*yatha svaṃ ca gandhavarnarasābhi nirvartanam*).²⁶

The factors that aggravate *pitta* are shown hereunder. They are grouped as those related to foods and drinks, psycho-somatic factors and other habits and factors connected with seasonal and climatic aspects.²⁷

²³ CS. *Sūtra*, 18.50

²⁴ SU. *Sūtra*, 15.2; 20.10

²⁵ AH. *Sūtra*, 11.5

²⁶ CS. *Sūtra*, 20.15

²⁷ SU. *Sūtra*, 21.21-22

(i) Related to foods and drinks (*āhāra*) is the ingestion of foods predominantly *kaṭu* (pungent), *āmla* (sour) or *lavaṇa* (salty), *tikṣṇa* (sharp and irritant), having *uṣṇa vīrya* (thermogenic potential), *laghuguṇa* (property of lightness), *vidāha* (food turned sour), *tilataila* (sesamum oil), *tila pinyaka* (oil cake), *kulattha* (horsegram), *sārṣapa* (mustard), *ataṣī* (linseed), *haritaka śāka* (a kind of green leafy vegetable, a pot herb), flesh of *godhā* (alligator), *matsya* (fish), *aja* (meat of goat), *avi* (sheep), *dadhi* (curd), *takra* (buttermilk), *kurcikā* (a product of buttermilk), *mastu* (supernatant water on curd), *souvira* (sour gruel), *surāvikāra* (alcoholic beverages), *āmlaphala* (sour fruits) and *katvara* (buttermilk mixed with water).

(ii) The psycho-somatic and physical factors are *krodha* (anger), *śoka* (sorrow/grief), *bhaya* (fear), *upavāsa* (fasting) and physical acts like *maithuna* (excessive indulgence in sex).

(iii) The seasonal, climactic and other factors that aggravate *pitta* are *uṣṇa kāla* (summer) and *ghanānte* (autumn), *madhyāhne* (noon) and *ardharātrau* (mid-night) and *jīratyannne* (during the process of digestion).

Pitta is differentiated into five functional specialisations of the body.²⁸ They are:

(i) *pācakapitta* (related to process of digestion and metabolism)

(ii) *rañjakapitta* (connected with blood formation)

(iii) *sādhakapitta* (related to higher mental faculties and emotional states)

(iv) *ālocakapitta* (responsible for vision and colour perception)

(v) *bhrājakapitta* (connected with imparting characteristic colour and luster to skin and maintenance of body temperature)

Suśruta designated these as five *agnis* and called them as *pācakāgni*, *rañjakāgni*, *sādhakāgni*, *ālocakāgni* and *bhrājakāgni*.²⁹ In either nomenclature it is to be understood as activity involving *pitta* which is itself

²⁸ AH. *Sūtra*, 12.10; Hemādri and Aruṇadatta on 12.10

²⁹ SU. *Sūtra*, 21.10

as *agni*. Briefly their location and functions will be discussed. The order of presentation will be *rañjakapitta*, *ālocakapitta* and *bhrājakapitta* followed by *sādhakapitta* and *ālocakapitta*. The reason is that the first three can be grouped into one category – all having pigments responsible for their action – *rañjaka* of *rañjaka pitta* linked with haemoglobin, *prakāśana* (vision) with *ālocaka pitta* linked with rhodopsin and *varṇakara* and *prabhākara* (colouration of skin and luster) with *bhrājakapitta* linked with melanin. This will be followed by *sādhakapitta*, which has lead role in higher mental activities and emotional states. The discussion on *pācaka pitta*, a key player responsible for digestion, absorption and metabolism, which has significant place in the study of *kāya cikitsā*, is taken up at the end. Suśruta mentioned *pitta* located in *yakṛt* (liver) and *plihā* (spleen) is *rañjaka pitta*.³⁰ It imparts colour to *rasa*, the ultimate nutrient essence (*rasarāgakṛt*). Vāgbhaṭa identified its location in *āmāśaya*³¹ (stomach) and ascribed the same function indicated by Suśruta. Caraka mentioned *rasa* acquires redness from the colour of fire-like *pitta*.³² These point that *rañjakapitta* is a key component in the formation of *rakta* (blood).

A feature of interest here is the therapeutic use of *yakṛt* in the treatment of excessive blood loss. Suśruta recommended intake of blood with honey or eating raw liver with *pitta*.³³ Another interesting therapeutic application is intake of liver and also use as collyrium in night blindness.³⁴ Experimental studies of Minot and Murphy for the treatment of anemia in dogs in 1926 with liver showed it as an effective ingredient, and this was added to the therapeutic armamentarium of pernicious anemia with advantage. Further studies identified the haematopoietic principle, which is known as anti-anemic principle.³⁵ Another feature of interest is the identification of haematinic principle in the gastric tissue, known as gastric

³⁰ Idem

³¹ AH. *Sūtra*, 12.13

³² CS. *Cikitsā*, 15.28

³³ SU. *Uttara*, 45.28

³⁴ Idem

³⁵ *Pharma. Med. Practices*, pp.725 and 729

principle, by Castle (1929).³⁶ These two findings of the previous century explain the strength of the therapeutic indications of Suśruta and Vāgbhaṭa in the treatment of *pāṇḍu* (anemia). It is now known that the antianemic principle of the stomach, interacting with the extrinsic factor of diet is stored in the liver, and perhaps may also be in other organs. Modern physiology refers to the part played by the red-bone-marrow in the formation of blood.

It is to be considered whether the reference that marrow is situated in the large bones excludes presence of such *majjā* (marrow) in other bones. A statement of Suśruta³⁷ *sarakta medas* (fat mixed with blood) in these other bones needs elucidation. Could it be a seat for *rakta* or has any role in the blood formation? Most of the modern studies seem to come closer to *rañjaka pitta*.

The *pitta* located in the visual organ (eye) is designated as *ālocakāgni*³⁸ by Suśruta. Other *ācāryas* of the ayurvedic treatises referred it by name *ālocakapitta*. Caraka did not make any specific mention except indicating in a general way among the functions of *pitta* as *darśana/adarśana*, meaning vision/impairment of vision.³⁹ Cakrapāṇi commenting on this attributed the function to *ālocakapitta* (*darśana adarśana netragatālocakasya*).⁴⁰ Vāgbhaṭa indicated that it is located in the eye and its function is *rūpagrahaṇa*,⁴¹ i.e., catching images presented to the eye.

Bhela visualized two aspects of *ālocakapitta*; they are (i) *caḥsur-vaiśeṣika* and the other (ii) *buddhi-vaiśeṣika*. Bhela quoted Punarvasu Ātreya as saying that *ālocaka* is that which is roused by *varṣā* (rain) *śīta* (cold) and *tāpa* (heat, specially of sun). It is of two kinds, i.e., one which is a factor in the eye, and the other concerned with *caḥsurbuddhi*.⁴² *Caḥsur-*

³⁶ Idem

³⁷ SU. *Śārīra*, 4-15

³⁸ SU. *Sūtra*, 21.13

³⁹ CS. *Sūtra*, 12.11

⁴⁰ Idem, Cakra. On 12.11

⁴¹ AH. *Sūtra*, 12.13

⁴² BS. *Śārīra*, 4.4

vaiśeṣika, which, by bringing about the contact of *manas* with soul, causes cognition transmitting it to the *citta*; this produces the discriminative visual knowledge by which different objects are comprehended by the eye.⁴³ The characteristics, form, colour, etc., of such things as flowers, fruits and leaves in all forms of life. The second one, i.e., *buddhi-vaiśeṣika*, which is situated at the point between the two eyebrows, is called *śṛṅgāṭaka*, it seizes subtle objects, retains and recalls them. This *ālōcakapitta* enables concentration, response and cogitation;⁴⁴ it is suggestive of the prefrontal association area and optic *thalamus*.

These two aspects of *ālōcakapitta* may be considered to be related to optical vision (*cakṣurvaiśeṣika*) and mental vision (*buddhivaiśeṣika*). This division of *ālōcaka* is not found in any treatise of Ayurveda. Caraka used the term *cakṣurbuddhi* (visual perception) while describing sense organs and the extent it fits into Bhela's theme needs scrutiny. *Ālōcakapitta* with its role in *rūpagrahaṇa* (catching images presented to the eye) and vision, and the Bhela's view of *cakṣur-vaiśeṣika* which enables to discriminate the colour and form of flowers, fruits and leaves which occur in a variety of forms and hues. The other type, *buddhi-vaiśeṣika*, is responsible for concentration, response and cogitation. Such modern contributions as photochemical reactions, consequential nerve impulses, colour visions, perception of sharp and bright images, and role of rods in the production of rhodopsin of the modern ophthalmology may provide their meaningful interpretation.

Bhrājakapitta is located in the skin. It imparts characteristic colour and luster. It governs the body temperature-normal and abnormal. Caraka has not described this as a separate entity. He mentioned the functions of *pitta* in a general way, and in that mention is made that *pitta* is concerned with production of temperature of the body and colour of the skin.⁴⁵ Cakrapāṇidatta, in his commentary, mentioned these functions are of

⁴³ Dasgupta, p.341-42

⁴⁴ BS. *Śārīra*, 4.5

⁴⁵ CS. *Sūtra*, 12.11

bhrājakapitta.⁴⁶ Suśruta, Bhela and Vāgbhaṭa made specific mention separately and also the functions ascribed to it.

Suśruta said the *pitta* located in the skin is *bhrājakāgni*. It enables the digestion of substances used for *abhyāṅga* (massage with unctuous substances), *paṛiṣeka* (bath), *avagāha* (sitzbath), *ālepa* (application of drug substance in the form of paste or ointment) and also illumines various shades of complexion.⁴⁷ *Ḍalhaṇa* observed by *tvak* (skin) it is understood as *bāhyatvak*, known as *avabhāṣinī*. By *abhyāṅga* is meant employing substances for preparation and action; *cchāyā* refers to the radiation (illumination) due to *pañcabhūtas*; *bhrājaka* is responsible for the digestion of substances applied to skin.⁴⁸

Bhela says *bhrājakapitta* is responsible for the manifestation of the specific characteristics of the body. It emphasizes its importance, creates different *prabhā*, the (hues) of the head, hands, feet, sides, back, abdomen, thighs, face nails, eyes and hair. It also brightens them.⁴⁹ Vāgbhaṭa says *bhrājaka* is located in the skin and it is so called because it imparts luster to skin and makes it radiate.⁵⁰ *Aruṇadatta* observes that it is known as *bhrājaka* because it performs *dīpana* (stimulating/promoting *agni*) and *pacana* (digestion) of substances used for *abhyāṅga*, *lepa*, etc.⁵¹

The foregoing taken together point (i) that *bhrājakapitta* is a functional species of *pitta* described in Ayurveda (ii) it is located in the layer of *avabhāṣinī* (iii) its functions are (a) production of normal and abnormal heat of the body (Caraka) (b) the production of normal and abnormal colour of the skin as a whole (Bhela) and (c) the absorption and digestion of substances used in combination with oils (for oil bath), decoctions used for sprinkling over the body (*Ḍalhaṇa* and *Aruṇadatta*). In modern parlance the colour of the skin depends on melanoblasts and

⁴⁶ Idem, Cakra on 12.11

⁴⁷ SU. *Sūtra*, 21.10

⁴⁸ Idem, *Ḍalhaṇa* on 21.10

⁴⁹ BS. *Śārīra*, 4.6

⁵⁰ AH. *Sūtra*, 12.14

⁵¹ Idem, *Aruṇa* on 12.14

melanin concentration. Melanin is found in retina, ciliary body, adrenal medulla, etc. It can be surmised that the *bhrājakāgni* located in *avabhāṣinī* is responsible for providing the pigment which confers on its characteristic normal colour. The same is true in case of hair, eye, etc. Bhela indicated it is due to *bhrājakapitta*.

Sādhakapitta, by that nomenclature, is not found in *Carakasamhitā*. However, of the functions included under *pitta*, one finds reference to *śaurya* (intrepidity, valour), *bhaya* (fear), *krodha* (anger), *harṣa* (exhilaration), *moha* (confusion) and *prasāda* (lucidity),⁵² that are ascribable to *sādhakapitta*. Cakrapāṇi described this *pitta* as *sādhakapitta* and identified its location as *hṛdaya* (heart).⁵³ Suśruta mentioned the *pitta* located in *hṛdaya* is to be known as *sādhakāgni*, and its function is to enable accomplishment of one's aspirations.⁵⁴ Ḍalhaṇa, in his commentary, observes that it enables one to accomplish one's *manoratha* (mental aspirations) namely *dharma* (virtue), *artha* (wealth), *kāma* (gratification), and *mokṣa* (emancipation). This is accomplished by dispelling *kapha* and *tamas* (ignorance/illusion) of the *hṛdaya*, and enables to perceive things clearly.⁵⁵

*Aṣṭāṅgasamgraha*⁵⁶ and *Aṣṭāṅgaḥṛdaya*⁵⁷ located *sādhakapitta* in *hṛdaya* and indicated it responsible for *buddhi* (intelligence), *medhā* (memory and intellect), *utsāha* (enthusiasm), *abhimāna* (self-esteem) and the capability to achieve one's aspirations. From the foregoing it will be seen that it is connected with higher mental faculties and emotional states, and would therefore present a psycho-physiological outlook.

Now, the issue is to identify *hṛdaya*, said to be seat of *sādhakapitta*. *Amarakośa*, an encyclopedic lexicon, mentions *cetas*, *svānta*, *hṛdaya* and

⁵² CS. *Sūtra*, 12.11

⁵³ Idem, Cakra on 12.11

⁵⁴ SU. *Sūtra*, 21.10

⁵⁵ Idem, Ḍalhaṇa on 21.10

⁵⁶ AS. *Sūtra*, 20.1

⁵⁷ AH. *Sūtra*, 12.11

manas as synonyms of *hṛdaya*. Suśruta says that *hṛdaya* is located on the left side of *kloma*, above *yakṛt* (liver) and above *plihā* (spleen) and to the right of *phupphusa* (lung). This is the location of anatomical heart said to be seat of consciousness (*cetanāsthāna*),⁵⁸ and root of *prāṇavaḥasrotas* (corresponding to respiratory apparatus) and *rasavaḥasrotas* (corresponding to lymphatic system).⁵⁹ The body, *vijñāna* (knowledge), *indriya* (cognitive and conative organs), *indriyārtha* (sense objects), the *ātman* (soul) with its attributes *cetas* (mind) and *cintya* (mental concepts), are all dependent on *hṛdaya*.⁶⁰

Bhela Samhitā says *manas* is enclosed between *śīras* and *tālu* (hard palate). It is the controller of all *indriya* (cognitive and conative). It receives the objects of senses, i.e., *rasa* (taste), *gandha* (smell), *sparsā* (touch) and *śabda* (sound). The power of all *indriyas* is derived from *manas*. The cause of different modes of the functioning of the intellect is *citta*, located in *hṛdaya* and basis of all other functions. When *citta* has ability to discriminate between action and inaction, good and bad, it is spoken of as *buddhi*. The one who possessed this is *buddha*.⁶¹ Again Bhela notes there is one *hṛdaya*, and it is the *cetanāsthāna* (seat of consciousness).⁶² Citing Parāśara,⁶³ he says *hṛdaya* is the foremost organ to be formed in the evolution of the body.

Bhela also referred to Bharadvāja who held the view that *śīras* (head) is the *mūla* (root) of *vijñāna* (knowledge).⁶⁴ A similar observation is found in *Carakasamhitā*: the part wherein the vital breath of the living

⁵⁸ SU. *Śārīra*, 4.31

⁵⁹ CS. *Vimāna*, 5.7

⁶⁰ CS. *Sūtra*, 30.4

⁶¹ BS. *Cikitsā*, 8.2-4

⁶² BS. *Śārīra*, 7.3

⁶³ Idem, 4.30

⁶⁴ *ibidem*

beings is located, and also all the sense organs, and which is the best among all parts of the body is known as *śiras* (head).⁶⁵

The observation of Bhela relating to *manas*, its location and activities earlier discussed, shows that *manas*, in this context, is not the heart. The earlier reference of Caraka on head being the seat of all senses and vital activities, also strengthens the view that it is related to *manas*. It is to be kept in view the word *hṛdaya* is used as a synonym for *manas*. The higher mental activities and emotional states are directed to brain rather than to heart. Before proceeding to the study of phenomenon of *nidrā* (sleep), *buddhi* (intelligence), *medhā* (memory and intellect), *abhimāna* (self-consciousness), *krodha* (anger), *bhaya* (fear), *śoka* (grief), etc., with which *sādhakapitta* is correlated, a reference from Bhela, which defines *sādhakapitta*, may also be helpful for further understanding and appreciation.

Sādhaka is that which enables the reception of *śabda*, (sound), *sparsa* (touch) *gandha* (smell), etc; as well as to achieve *artha* (wealth) and *kāma* (gratification), to satisfy one's aspirations here, and to please gods, foreparents and sages in the hereafter.⁶⁶ This means it is *sādhakapitta* which is responsible for reception of auditory, tactile, gustatory, olfactory and such other stimuli by the respective special receptor organs and their transmission through different pathways to appropriate areas in the cerebrum; construct from sense-impressions, thus secured, a picture of the outside world, within which they plan and carryout desired actions or ends. This, in parlance of modern physiology, means that the individual obtains a selective and subjective interpretation of his/her environment from the sensory part of his nervous system. For example eyes deal with a selective aspect of solar energy – the spectrum – while ears are concerned with the atmospheric disturbance that constitutes the sound waves.

⁶⁵ CS. *Sūtra*, 17.12

⁶⁶ BS. *Śārīra*, 4.8

The phenomena with which *sādhakapitta* is concerned namely *nidrā* (sleep), *medhā* (knowledge, intelligence), *abhimāna* (self esteem), etc., are briefly discussed to ascertain the role on the extent to which mind is involved.

Nidrā (sleep): Caraka ascribed the cause of sleep to *klānta* (fatigue) and *klāma* (weariness, exhaustion) of the mind and body. This causes distraction of sense organs from their objects.⁶⁷ Suśruta mentioned the heart is the seat of consciousness and sleep gets access when it is enveloped by *tamas*.⁶⁸ Ḍalhaṇa while commenting on functions of *sādhakāgni* (*sādhakapitta*) indicated *sādhakapitta* (*agni*) dispels the *kapha* and *tamas* of *hṛdaya* and enables the *manas* to perceive things clearly.⁶⁹ A number of view points are advanced and they call for study and some proper collaboration. Some of the recent studies point to the presence of sleep center in hypothalamus which is also the center for sympathetic and parasympathetic. Sleep is mentioned as function of parasympathetic. There is a view that waking center exists in hypothalamus and the inhibition of this causes sleep. There is yet another theory advanced in the form of Cortical Theory of Sleep which says the sleep is due to inactivity of the cerebral cortex which arises from the reduction in the number of different impulses, especially from the muscles, reaching sensory areas. Another factor that leads to sleep is the exclusion of stimuli from the visual, auditory and cutaneous receptors. Cortical activity due to psychic factors *śoka* (sorrow), *bhaya* (fear), etc., may prevent sleep. Cortical activity is reconciled with that of hypothalamus having a sleep center. The mechanism of sleep seems to be an enigma. Bhela's definition of *sādhakapitta* together with the concept of *nidrā* (sleep) of Caraka and Suśruta seem to have a plausible explanation. Cerebral cortex, known as *mastiṣka* in ayurvedic parlance, is essential for sensory appreciation and voluntary movement; these capacities are reduced during sleep.

⁶⁷ CS. *Sūtra*, 21.35

⁶⁸ SU. *Śārīra*, 4.35

⁶⁹ Ḍalhaṇa on SU. *Sūtra*, 21.10

Sleep results from decrease in number of impulses flowing to cerebral cortex. This is shown as due to fatigue of the neuro-muscular function. In turn it is not able to pass on proprioceptive impulses. This supports the reference of Caraka which indicated *klānta* or the fatigue of the mind and the *klāma* or the fatigue of the body senses, which thereby causes a breach in the senses and sense objects contact. This in modern parlance may be mentioned when the afferent pathways are unable to conduct different kinds of external and internal stimuli due to fatigue. Bhela, while referring to functions of *sādhakapitta*, indicated sleep requires reduction of light and sound. This reduces the sensory barrage to the cerebral cortex. The conduct of these impulses to *manas* (mind) is the function of *sādhakapitta*. *Sādhakapitta* dispels *kapha* and *tamas* and provides lucidity to perceive things clearly. Psycho-emotional factors like fear, anger, worry, excite the cerebral cortex, thereby preventing sleep. This again is the function of *sādhakapitta*. The hypothalamus in the mid-brain is stated to be center to influence sleep or wakefulness. The various autonomic function-changes that accompany sleep are coordinated by hypothalamus. Depression of sympathetic center leads to sleep and hence the sleep is considered a parasympathetic function. The parasympathetic and sympathetic functions respectively are correlated to a acetylcholine and sympathin, in both neurohumoral substances. All these point to *mastiṣka* (brain) and associated enzyme system, and hormones catalysed by the brain enzyme that are linked to sleep and calls for review of *sādhakapitta* in the light of available modern knowledge. The foregoing has unequivocally showed that the anatomical heart has no role in *nidrā* (sleep).

Sādhakapitta is concerned with *buddhi* (intelligence), *medhā* (memory, intellect) and *abhimāna* (self-conscious, also ego). *Sādhakapitta* is located in *hṛdaya* and earlier it was indicated that *hṛdaya* is the seat of *manas*. The functions of *manas* are the direction of *indriyas* (both cognitive and conative), control over senses, reasoning, and analyzing and beyond this is the jurisdiction of *buddhi*.⁷⁰ The faculty of thinking, the capacity to

⁷⁰ CS. *Śārīra*, 1.21

analyse and reason, meditate and determine are the objects of *manas*.⁷¹ Caraka has described as intellect the mental process that leads to knowledge, which is an essential ingredient of intelligence. The sense object is cognized by the *indriya* (sense organ) that is in contact with *manas*. The mind analyses it in form of *guṇas* (merits) or *doṣas* (demerits) and forwards it to *buddhi* (intellect) that produces decisive knowledge by which one proceeds to speak or to act, with full knowledge.⁷² The foregoing are meant to focus attention to mental process related to *buddhi* (intelligence) *medhā* (intellect) and *abhimāna* (self conscious, also ego).

Emerging from the foregoing are the *manas* and the *indriyas* (both cognitive and conative) related to each other. The location of *manas* is between the hard palate and skull. The *manas* is controller of *indriyas*. The sense organ cognized by the *indriya* is in contact with *manas* (the mind) that analyses and forwards to *buddhi* that provides decisive knowledge. The *buddhi* is enabled by *citta*, an aspect of *manas*, to discriminate between good and bad, right or wrong, the reaction to events, the personality make up and the behavioral pattern of the individual.

Experimental studies and clinical observations by the experts of Neurophysiology and Neuropsychology are likely to provide modern insights to this concept of *sādhakapitta*. Modern theories of intelligence, memory, intellect and ego factor may help to provide interpretative profile for these phenomenons of Ayurveda.

The emotional states correlated with *sādhakapitta* are *śoka* (grief, sorrow), *bhaya* (fear), *krodha* (anger) and *harṣa* (exhilaration). These are related to feeling-life or affectivity, i.e., strong temporary variations and expressions of the *self-feeling*. Experimental evidence and clinical observations have shown that thalamus and hypothalamus, particularly hypothalamus, govern and mediate affective experiences by correlating the thought content and conative activities. Reactions, which accompany displeasure and anger, are evoked in decorticated animals. This

⁷¹ Idem, 1.20

⁷² *ibidem*, 1.22-23

manifestation represents a combination of *bhaya* (fear) and *krodha* (anger, rage).

Reports on decortication experiments have shown that the animal deprived of its cortex exhibits signs of violent and exaggerated rage and other associated phenomenon. Today, with advances in the fields of neurophysiology, psychophysiology, neuropharmacology, psychopharmacology, hormonal and enzyme chemistry, it is possible to provide meaningful correlation to various functions ascribed to *sādhakapitta*.

Pācaka pitta, also known as *pācakāgni*, has key role in the process of digestion and metabolism. This is referred as leader/master of all *agnis*, the increase or decrease of other *agnis* depends on this and hence it is to be maintained by intake of wholesome food and drinks.⁷³ Food is the factor that supports and sustains the *dhadhātus* (tissue elements), *bala* (strength or capacity to perform physical work), *ojas* (the factor of resistance to disease and decay) and complexion among others. These cannot take place unless the food is properly digested by *agni*.⁷⁴ The *pitta* located in the area between *āmāśaya* (stomach) and *pakvāśaya* (small intestines) digests four types of foods, i.e., *aśita* (eatables), *khādita* (masticatory), *pīta* (drunk) and *līda* (licked) ingested by the individual and eliminate the residue in the form of urine and faeces.⁷⁵ Vāgbhaṭa added that it is *pañcabhautika* in constitution (having the five elements – *prthvī*, *āp*, *tejas*, *vāyu* and *ākāśa*) and it is *drava* (liquid) in consistency. In spite of that, there is the dominance of *tejas* over the rest of *pañcamahābhūtas* that compose it. In addition to the digestive functions and nutrients (*sara*), it contributes to augment the functioning of other *pittas* located elsewhere in the body.⁷⁶ Suśruta and Vāgbhaṭa indicated that *grahaṇi* is located between *āmāśaya* and *pakvāśaya*, that *agni* is strength to *grahaṇi* and *grahaṇi* to *agni*. Any deflections in one or the other upsets their functional integrity and causes a

⁷³ CS. *Cikitsā*, 15.39

⁷⁴ Idem, 15.5

⁷⁵ SU. *Sūtra*, 21.10

⁷⁶ AH *Sūtra*, 12.10-12; AS. *Sūtra*, 19.26-28

number of diseases.⁷⁷ *Grahaṇi* is the seat of *agni* and is called so because of holding the food. Normally it holds the food (till it is digested) and releases it after it is digested.⁷⁸ This region is also known as *pittadharakāla* and it is identified as *grahaṇi*. The main function of this part is providing support to *pācaka pitta*, which is required for the digestion of food that reaches this part on its way to *pakvāsaya*.

Āhārapacana (digestion of food) has been described as *avasthapāka* in which there is change in the state or form of food substances in the *āmāsaya* (stomach and small intestine) and *pakvāsaya* (large intestine) in the course of process of digestion. There are two phases of this *pāka-prapāka* and *vipāka*. *Prapāka*, defined as *prathamapāka*, is the first primary change in the process of digestion.⁷⁹ *Vipāka* is defined as changes to which the food that has undergone *prathamapāka* is again subjected to further changes under the influence of *jāṭharāgni* (*pācaka pitta*). These latter changes are described in terms of the *rasa* (taste) of the end products of gastro-intestinal digestion, i.e., *madhura vipāka* (sweet), *āmḷa vipāka* (sour) and *kaṭu vipāka* (acrid).⁸⁰

Prapāka (preliminary phase of digestion of food substances) takes place at *ūrdhvāmāsaya* (the fundus of the stomach) resulting in *madhurabhāva*. *Bodhaka kapha* located in the tongue, which has taste perception, is responsible. The component of *lālājāla* (saliva) acts on the food and causes *vibhājana* (breakdown of food). This, in modern parlance, is salivary digestion. Saliva moistens and lubricates the food mass and facilitate deglutition. This phase continues further and completed in *ūrdhvāmāsaya* (fundus of the stomach). The end products are sweet so called *madhurabhāva*. The process is assisted by *prāṇavāyu* in propulsion of food in the process of digestion.⁸¹ The next phase – *āmḷa bhāva* of *avasthapāka* – is the acid phase of *prapāka* and takes place in *adho-āmāsaya*

⁷⁷ AH. *Śārīra*, 3.53

⁷⁸ CS. *Cikitsā*, 15.56-57

⁷⁹ Cakra on CS. *Cikitsā*, 15.9

⁸⁰ AH. *Sūtra*, 9.20

⁸¹ CS. *Cikitsā*, 26.6; SU. *Nidāna*, 1.13; AH. *Sūtra*, 12.4

(small intestines). The outcome of this phase of digestion has been characterized as *vidagdha* – a stage of *pakvāpakva*⁸² (partly or not fully digested). The food in this stage is not fit for absorption and utilization in the metabolic process. *Kledaka kapha*, one of the functional kinds of *kapha*, located in stomach, participates in the phase. Another point of interest is the secretion of *achcha pitta*. Partly digested food material comes into contact with *pitta sthāna*. *Achcha pitta* is produced as the food rendered sour passes down into duodenum. This is a kind of stimulation of humoral mechanism present in the upper segment of *grahāṇī* (*adho-āmāśaya*, small intestines) or duodenum.

The concept of *achcha pitta* comprehends the gall bladder bile and pancreatic juices, which are responsible for subsequent stages of digestion. *Achcha pitta* forms part of the concept of *jatharāgni* (*koṣṭāgni*, *kāyāgni*, *pācaka pitta*).

Jatharāgnipāka is related to intestinal digestion and the process involved in it. The outcome of this aspect of *pāka* (digestion) is *vipāka* and is of three kinds, *madhura*, *āmla* and *kaṭu* based on the *rasa* (taste) of foods and drugs.⁸³ *Rasas* also have their origin from *pañcabhūtas*, and the study calls for examination of physico-chemical basis of the qualities and other attributes. *Bhūtāgnipāka* follows *jatharāgnipāka*. The outcome of *jatharāgnipāka* are two: (i) the *bhinnasamghāta* (splitting of the complex food substances into their ultimate elemental units which are of five groups – *pārthiva*, *āpya*, *tejas* (*agneya*), *vāyavya* and *ākāśīya* (*nābhasa*)). (ii) Activation of *agnibhūta* of these groups – *agni* present in *pārthiva* group – *pārthivāgni*, like wise for other *bhūtas*.

It will be of interest to find that *bhūtāgnipāka* plays a key role in the physico-chemical aspects of digestion and its relation to animated organisms. The animated organisms are composed of five *mahābhūtas* and the food of the living body is also *pañcabhautika* and it is digested by *jatharāgni* and the digested portion is further dealt with by the *bhūtāgnis*.

⁸² Cakra on CS. *Cikitsā*, 15.10

⁸³ AH. *Sūtra*, 9.21

The primary principles augment its homologue in the human body.⁸⁴ This lays stress on the fact that atoms for atoms and molecules for molecules must be obtained by the body from food sources for the maintenance of the integrity of its functional and structural constituents all of which are composed of *pañcabhūtas* at the fundamental level. This is a process of replenishment of what is destroyed to maintain structural and functional integrity.

The concept of *dhātvāgnipāka* or *dhātvāgnivyapara* is related to the absorption and utilization of *annarasa*. The term *agni* as indicated earlier stands for *pitta* and *pitta* performs functions very much like *agni* and the *agni* is implied in *pitta*. *Pāka* is related to chemical transformations, both reversible and non-reversible.

The term *dhātu* is derived from Sanskrit root *du-dhanj* meaning *dharana*, to support and *poṣaṇa*, to nourish. In the context of Ayurveda, *dhātu* refers to the following:

- (i) *dadhāti-dhatte vā śarīram manaḥ prāṇavi*, meaning that which supports the *śarīra* (body), *manas* (mind) and *prāṇa* (élan vital or life) is *dhātu*
- (ii) *dadhāti-dhatte vā rasaraktaamāṃsamedo' sthi majjāsukradhātūn iti*, i.e., that which supports the basic tissues of the body, viz., *rasa*, *rakta*, *māṃsa*, *medas*, *asthi*, *majjā* and *śukra* is *dhātu*
- (iii) *dadhāti-dhārayati śarīrasamvardhakāri iti*, i.e., that which promotes the growth of *śarīra* (body) is *dhātu*

The term *dhātu* applies in the following:

- (i) *doṣa*, *dhātu*, and *mala* support the body in normal states of body functioning,
- (ii) the digestive products present in *rasa* (chyle),
- (iii) the nutrients, in the course of the process of their metabolic transformations in the body, spoken of as the *poṣaka* (meant to

⁸⁴ CS. *Cikitsā*, 15.13; Cakra on 15.13; SU. *Sūtra*, 46.526; AH. *Śarīra*, 3.60

nourish) or *asthāyi* (mobile or non-static, movable). The *poṣakadhātus* comprise nutrients that are being metabolically processed and waste products that arise in the course of metabolic reactions.

- (iv) *Poṣya* (that which is meant to be nourished) or *sthāyi* (fixed, stable, static, a heady formed and existing) *dhātus*. In the context of *dhātuvāgnipāka* the term is strictly applicable to the (a) end products of gastro-intestinal digestion of the food ingested – *upadānarakasadhātu* as it is also called (b) nutrients absorbed from the *adho-āmāśaya* (*kṣudranta* or small intestines) which undergo metabolic transformation and yield, in the process, seven kinds of specific precursors, corresponding to the seven species of formed tissue elements into which latter they are meant to be incorporated (c) seven kinds of existing and formed basic tissue elements of the body viz., *rasa* (plasma?), *rakta* (erythrocytes?), *māṃsa* (muscle tissue), *medas* (adipose tissue), *asthi* (bone including the cartilage tissue), *majjā* (yellow and red marrow tissue) and *śukra* (reproductive tissue) and (d) metabolic waste products, parts of which are retained in the body to subserve some of its vital functions and parts utilized for the synthesis of such structures as hair of the head, face and body, nails, etc., and for composing its excrements.

The *upadānarakasā* absorbed from *adho-āmāśaya* represents in a potential form, the elements necessary for the synthesis of substance directly concerned with three *doṣas* and the seven species of *sthāyidhātus*. The nutrient elements still *vi-jātiya* (foreign) to the body are to be converted as *sajātiya* (organism specific) before they are finally utilized for the synthesis of *doṣas* and *dhātus*. This transformation is termed *pāka* that is brought about by the specific kinds of *uṣman*, associated with each *dhātu*. The term *dhātūṣman* means heat of *dhātu*. The term commonly used is *dhātuvāgni*. It stands for *pittas* concerned with *dhātus*. The appropriate nutrient substances, present in the potential form in the *āhārarakasā*, replenish

the seven *dhātus*. The table presents the *dhātāvāgnipāka* or intermediate metabolic events (vide Annexure A).

The entire process right from ingestion of food to the formation, replenishment of tissue *dhātus* is due to the role played by *pitta* at every stage. It is also to be kept in mind that the entire process is an integrated one, meaning thereby participation of all *doṣas*, *dhātus* and other system components.

List of Abbreviations relating to References

The Aṣṭāṅga Hṛdaya composed by Vāgbhaṭa with Commentaries of Sarvāṅga Sundara of Aruṇadatta and Āyurveda Rasāyana of Hemādri. Ed. Bhiṣagāchārya Harisastri Paradkar Vaidya. Bombay, Nirnaya Sagar Press, 1939. **AH**

Aṣṭāṅga Saṃgraha. Hindi Translation by Kaviraj Atrideva Gupta. Bombay, Nirnaya Sagar Press, 1951. **AS**

Bhela Saṃhitā. New Delhi, Central Council for Research in Indian Medicine and Homoeopathy, 1977. **BS**

The Carakasamhitā by Agniveśa, Revised by Caraka and Dṛdhabala with Ayurveda Dipikā Commentary of Chakrapāṇi Datta. Ed. Jadaviji Trikamji Ācārya, 3rd ed. Bombay, Nirnaya Press, 1941. **CS**

Dasgupta, Surendenath, *A History of Indian Philosophy*. 1st Indian Edition. Delhi, Motilal Banarsidass, 1975. **Dasgupta**

Kāśyapa Saṃhitā (on Vṛdājivakiya Tantra) with Sanskrit Introduction, A Hemarāja Sarma with Hindi commentary. Varanasi, Chowkhamba Sandk, 1953. **KS**

Mādhavanidāna – Madhu Kośa **MN**

The Pharmacological Principles of Medical Practices, John C. Krantz and C. Jeneff Carr, Indian ed./6th edition. Calcutta, Scientific Book Agency, 1965. **Pharma. Med. Practices**

Śabdastoma Mahanidhi. Varanasi, Chowkhamba Sanskrit Series Office, 1967. **SSM**

Siddhānta Kaumudī of Bhattoji **SKB**

<i>Suśruta Saṃhitā</i> of Suśruta with Nibandha Sangraha, Commentary of Ḍalhaṇācharya, 4 th edition. Varanasi, Chaukhamba Orientia, 1980.	SU
Aruṇadatta on <i>Aṣṭāṅgahṛdaya</i> .	Aruṇa
Cakrapāṇi on <i>Carakasamhitā</i> .	Cakra
Cakrapāṇi on <i>Suśruta Saṃhitā</i> .	Cakra-Bhānumatī
Ḍalhaṇa on <i>Suśruta Saṃhitā</i>	Dalhaṇa
<i>Cikitsā Sthāna</i>	<i>Cikitsā</i>
<i>Nidāna Sthāna</i>	<i>Nidāna</i>
<i>Uttara Tantra</i>	<i>Uttara</i>

ANNEXURE

Dhātuvāgnipāka or intermediate metabolic events

Species of <i>dhātuvāgni</i> acting upon	The basic nutrient substrate present in the absorbed <i>āhāra</i> or <i>annarasa</i>	Results in the production	
		in <i>prasādapāka poṣaka dhātu</i>	and in <i>pitta pāka</i> , substances meant either to be eliminated through or built up in
<i>rasāgni</i>	<i>upādāna rasa dhātu</i> or substances meant to be incorporated in the structural constituents of <i>sthāyirasa dhātu</i> .	<i>poṣaka</i> or <i>asthāyī rasa dhātu</i> which enters into the constituents of <i>sthāyī rasa dhātu</i>	the constituents of <i>śleṣman</i> or mucinous discharges
<i>raktāgni</i>	nutrients of <i>sthāyī rakta dhātu</i> now present in circulating <i>sthāyirasadhātu</i>	<i>poṣaka</i> or <i>asthāyī rakta dhātu</i> meant to be utilised for the synthesis of <i>sthāyī rakta dhātu</i>	the constituents of <i>pitta</i> or bile meant to be eliminated as waste-products
<i>māṃsāgni</i>	nutrients of <i>sthāyī māṃsa dhātu</i> present in the circulating <i>sthāyirasadhātu</i>	<i>poṣaka</i> or <i>asthāyī māṃsa dhātu</i> meant to be utilised for the synthesis of <i>sthāyī māṃsa dhātu</i>	waste-products which are eliminated through <i>karṇamala</i> , <i>aṅśimala</i> , <i>nasikāmala</i> , <i>āśyamala</i> , <i>lomakupamala</i> , <i>prajananamala</i>
<i>medogñi</i>	nutrients of <i>sthāyī medo-dhātu</i> present in the circulating <i>sthāyirasadhātu</i>	<i>poṣaka</i> or <i>asthāyī medo-dhātu</i> meant to be utilised for the synthesis of <i>sthāyī medo-dhātu</i>	waste-products which are eliminated through <i>sveda</i>
<i>asthyagni</i>	nutrients of <i>sthāyī asthi dhātu</i> present in the circulating <i>sthāyirasadhātu</i>	<i>poṣaka</i> or <i>asthāyī asthi dhātu</i> meant to be utilised for the synthesis of <i>sthāyī asthi dhātu</i>	waste-products utilized in the synthesis of substances that compose <i>keśa</i> , <i>śmaśru</i> , <i>loma</i> , <i>nakha</i>
<i>majjāgni</i>	nutrients of <i>sthāyī majjā dhātu</i> present in the circulating <i>sthāyirasa dhātu</i>	<i>poṣaka</i> or <i>asthāyī majjā dhātu</i> meant to be utilised for the synthesis of <i>sthāyī majjā dhātu</i>	waste-products that enter into the composition of <i>aṅśisneha</i> , <i>vītsneha</i> and <i>tvak sneha</i>
<i>śukrāgni</i>	nutrients of <i>sthāyī śukra dhātu</i> present in the circulating <i>sthāyirasa dhātu</i>	<i>poṣaka</i> or <i>asthāyī śukra dhātu</i> meant to be utilised for the synthesis of <i>sthāyī śukra dhātu</i>	waste-products which are utilised in the synthesis of <i>ślaishmika ojas</i>

THE CONCEPT OF PAÑCAMAHĀBHŪTA AND ITS APPLICATIONS

Vaidya Kedar R. Shende
Pune

Śrī Dhanvantaraye namaḥ

I bow down to Lord *Śrī Dhanvantari*

Śrī Gurave namaḥ

I bow down to Late *Appāsāstri Dātār*, the *guru* of our traditional *pāñcabhautika* school

Namaḥ sabhābhyāḥ sabhāpatibhyaśca vo namo ...

I bow down to the *sabhā*, this gathering of learned scholars and the *sabhāpatī*, the chair of this *sabhā*.

After seeing the list of all the distinguished audience from varied faculties like health sciences, social sciences, anthropology, indology and a host of others, I have tried my best to reach out to all of those present. This is a balancing act and I hope I shall be successful.

Pañcabhūtātmake dehe cikitsā pañcabhautikī

The *loka* (macrocosm / universe), as well as the *puruṣa-deha* (microcosm), is *pāñcabhautika*. Everyone and everything, whether food or medicines are made up of *pañcamahābhūta*. The concept of *mahābhūta* is very much ingrained in all the ayurvedic texts, but to locate it one has to, sometimes, read in between the lines and *Appāsāstri* did just that. When traditionally everyone was talking in terms of *doṣas*, *Appāsāstri* worked analytically and converted these into more specific portions. Although everyone knew, for example, that *kapha doṣa* is made up of *prthvī* and *āp mahābhūta*, their application in *nīdāna* (diagnostics), *cikitsā* (therapeutics), pharmacology, etc., was not put in black and white on paper. *Appāsāstri* did this and presented it in his works and books which are available, unfortunately, only

in Marathi language as of today. Rather than the usual *nāḍī parīkṣaṇa* and other methods of diagnosis, he formulated his own method of *udara-parīkṣaṇa* (abdominal examination). This he used with great finesse, along with local examination of affected organs.

Ayurveda as we learn in colleges is much different from what we learn traditionally at a *guru's* place. In a *guru's* place the study is more clinical and more practical oriented; it is not a very text book type of learning. In this, or for that matter, any other traditional system of learning, the knowledge acquired is so subjective that its representation or re-expression is very difficult. This problem has to be resolved, if necessary, by having a common platform for men of science, linguistic experts and other related professionals.

Before going into the details of *pañcamahābhūta*, let us see certain basic principles of Ayurveda.

Doṣa-dhātu-mala mūlam hi śarīram Su.Sū.3

Doṣa-dhātu-mala mūlam sadā dehasya A.H.Sū.1

Doṣa, *dhātu* and *mala* are the roots of the *deha*. The *deha* is the body along with the *cetanā* / *ātman*, which is the subject of Ayurveda. All the above constituents are continuously being produced within the body and are active within it.

Dhātu: *dhāraṇat dhātavaḥ ...*

The word *dhāraṇa* means to materialise or assume physical form.

During the process of *pacana* (digestion) – *sthūla* (gross) and *sūkṣma* (subtle) –, all body components are continuously being formed. There are some which are ‘absorbable’ while some are ‘excretable’. The *sāra* (absorbable) components, that ‘give form’ to the body are the *dhātu*. They are the ‘building blocks’; they form the various structures within the body and thus give it a definite existence. They are analogous to the ‘tissue’ concept of modern medicine. Growth of *dhātu* gives strength to the body. If the formation and growth of the *dhātu* is proper, the body is healthy.

Any abnormal growth whether accelerated (increased) or retarded (reduced), excessive ‘wear and tear’ or loss, qualitative or functional anomaly in these *dhātu* can lead to *roga* (disease).

Number of *dhātu* is seven, viz., *rasa*, *rakta*, *māṃsa*, *medas*, *asthi*, *majjā*, *śukra*.

Mala: *malinikaraṇāt malaḥ ...*

During the process of *sthūlapacana* and *sūkṣmapacana*, the excretable portions that are formed are called *mala*. Even though they are discardable, they are very important. Rather, they are important because they are discardable.

Any abnormality in production as well as excretion of *mala* can lead to disease. There are various types of *mala* but the three most important are *śakrut* (faeces), *mūtra* (urine) and *sveda* (sweat).

Doṣa: *dūṣaṇa svabhāvāt doṣaḥ. Dūṣayati nāma vikāram janayati iti doṣaḥ ...*

There is another group of body components, other than the two above, that is responsible for all the functions within the body. They are formed along with the *mala* but are not entirely discardable or excretable. On the contrary, their presence is the main source of all physiological activity within the body. In a healthy body they are in a state of equilibrium. Destabilising factors or unfavourable conditions like faulty *āhāra* (diet), *vihāra* (behaviour), climatic changes, etc. can lead to their equilibrium being disturbed. Not only do they get ‘disturbed’ themselves, but they also disturb the functioning of the other components, leading to disease.

Vāta, *pitta* and *kapha* are responsible for the existence of the *deha*. They occupy the lower, middle and upper parts of the body respectively and materialise the body. (Su.Sū.3) There are three *doṣa*, viz. *vāta*, *pitta* and *kapha*. When *vikṛta*, i.e., abnormal/unbalanced (increased/decreased or vitiated), they destroy the body (through disease). When *avikṛta*, i.e., normal/balanced, they keep the body in health. (A.H.Sū.6)

The *doṣa* reside below the umbilical region (*vāta*), within the umbilical region (*pitta*) and above the umbilical region (*kapha*). Yet, when the word ‘*vyāpino*’ is used, it means they are all over the body. (A.H.Sū.7)

Sarvadehavyāpitve api yo asmin adhikyena vartate, tat yasya sthānam.

Hemādri, a commentator on *Aṣṭāṅga Hṛdaya*, explains that *doṣa* exist all over the body but the sites where they are dominant are called their respective sites. In spite of the fact that they are functional throughout the life, yet they are dominant in last, middle and first parts of life, day, night and period after meals. Thus old age, last part of day, i.e., evening, later part of night just before dawn, last part of digestive period, when digestion is prominent in the *pakvāśaya* (colon) is *vāta kāla*. Middle age, afternoon, middle part of night, middle part of digestive period, when digestion is prominent in *grahāṇī* (small intestine) is *pitta kāla*. Young age or infancy, morning, early night, early part of digestive period when the digestion is prominent in *āmāśaya* (stomach), is *kapha kāla*. (A.H.Sū.8)

Vāta doṣa:

Mahābhūta configuration:

Vāyvakāśa dhātubhyām vāyu. (A.H.Sū.1)

Vāta is made up of *vāyu* and *ākāśa mahābhūta*.

Functions:

All activity is at the behest of *vāta*. It is the *doṣa* which controls all mechanisms, movements, gives definite arrangement to various body organs, is the source of energy and is the propulsive / driving / motivating factor for the other *doṣa* which are said to be '*pañgu*', i.e., invalid or disabled without *vāta*.

Pitta doṣa:

Mahābhūta configuration:

Pittam agneyam (Su.Sū. 42)

Pitta is *agni* (*tejas mahābhūta*) dominant. Yet, another of its important qualities is *sara, drava*, i.e., fluid and liquid. This indicates the association of *āp mahābhūta*.

Functions:

All digestion, processing, conversion, etc., is due to *pitta*. It is responsible for the temperature of the body, for the sensation of hunger, thirst, luminance, intellect (intellectual processing), *śaurya* (bravery/valour), etc.

Kapha doṣa:

Mahābhūta configuration:

Ambhaḥ pṛthivibhyāṃ śleṣmā (A.S.Sū. 20)

Kapha doṣa is *āp* and *pṛthvī mahābhūta* dominant.

Functions:

To give stability, unctuousness, lubrication, holding together/binding of joints, strength, as nutritional and building blocks, etc. Thus main function is to build up the various body parts and organs and give them strength.

Sāmānya viśeṣa siddhānta:

sāmānya means similar or alike. *Viśeṣa* means unlike or dis-similar.

Siddhānta means law.

Sarvadā sarva bhāvānām sāmānyam vṛddhi kāraṇam

Harṣahetu viśeṣaśca pravṛttirubhayasya tu (Ca.Sū.1)

The use of substances of similar *bhāva* (qualities) causes an increase (in that quality/*bhāva*) while dis-similar ones cause a decrease. In short, using a substance of a certain *guṇa* would cause procreation/increase of a similar *guṇa* in the body. Vice versa, a substance with opposite/dis-similar *guṇa* would be used to decrease/reduce an unwanted *guṇa*. This is the most important and commonly applied law in Ayurveda.

Simple examples are consumption of *māṃsa* (muscle) increases *māṃsa*, consumption of *rakta* (blood) increases *rakta*, etc. On a deeper level, this law is applied not just to material substances but also to various *guṇa*. Thus on a coarse scale we know that *asthi* (bone) increases *asthi*. Thus bone given in a digestible form like *asthi bhasma* (bone ash) shall be used to increase or strengthen the *asthi dhātu* in the subject's body. On a finer scale, the question would remain which bone is better. If we observe various animals,

we see that the *aja* (ram/male goat), fights by hitting his head very hard indeed against its enemy. The bone of the ram is thus much stronger than the bone of other animals. Thus the *bhasma* (ash) of *ajāsthi* (bone of ram) is better suited than any other bone ash and results have shown this to be true. Similarly, the *māṃsa dhātu* of bull and horse are excellent for *māṃsa* treatment and so on.

Loka puruṣa siddhānta: *loka* means the universe/macrocosm/environment. *Puruṣa* means the body/microcosm.

Yāvanto hi loke mūrtimanto bhāva viśeṣa tāvantaḥ puruṣe yāvanta puruṣe tāvanto loke. (Ca.Sā. 5)

This is another very important law. The *bhāva* (qualities) that appear in the macrocosm exist in the microcosm (at least in seed or latent form) and vice versa. Thus the microcosm is a miniature replica of the universe so as the macrocosm is a huge replica of the microcosm. For example, just as the fire is used outside the body to cook or process raw food, similarly the *agni* (fire) in the body is used to digest/process the eaten food. Just as air is responsible for the movement of the clouds, etc. in the environment, similarly *vāta* is responsible for the movements of the other *doṣa* in the body which are disabled/impotent without it.

The pañcamāhabhūta:

Ākāśa, i.e., space, is all pervading and omnipresent. There is nothing without space. Even outer space, which is a vacuum, is not a negation of existence. Even empty space is positively an existence of ‘nothing’ or ‘emptiness’. This ‘nothing’ or space is *ākāśa*. On earth, exposed to our environment, vacuum cannot exist. Space gets filled immediately by air. Thus it acquires a certain ‘determinate’ quality. Here, the use of the word ‘determinate’ denotes something that can be measured, calculated, analysed and studied on the basis of certain parameters. Chemists would analyse the chemistry of the present gases; physicists would perhaps measure the pressure, temperature, etc. Thus, some determination, measurable by given

parameters, is acquired although air would not be seen. Perhaps under pressure or removal of heat, the air/gases would acquire a more determinate, visible yet unstable form of a liquid. Further cooling or pressure would stabilise even this into a stable, solid mass. Thus an evolution from the subtle to the determinate and stable forms is the progression path along which the *mahābhūta* were formed.

The *Taittiriyaopaniṣad* says: *Ākāśād vāyuḥ vāyor agniḥ agnirāpaḥ adbhyaḥ pṛthivī*.

Meaning thereby that *vāyu* from *ākāśa*, *agni* from *vāyu*, *āp* from *agni*, *pṛthivī* from *āp* were formed.

***Śṛṣṭi nirmāṇa* or creation and evolution of the Universe and its purpose:**

The scheme of evolution put forth by Suśruta is as follows: the *ātman*, or *cetanā* as it is called, is of two types. The *paramātmān*, or the supreme spirit which we refer to as God, and the *jīvātman* which is a fraction of the *paramātmān* and resides separately in each individual life form. The *ātman*, which has been referred to here, is the *paramātmān*.

This *ātman* is indeterminate, unmanifested, cannot be qualified by any adjectives. He is neither an evolvent nor an evolute. *Mūlaprakṛti* is the only primordial root-matter, only an evolvent and subject to change and transformation. Combination of *ātman* with *mūlaprakṛti* leads to *mahat* (also called *buddhi*) - the cosmic intellect. *Mahat* is an evolvent as well as evolute. From *mahat* arises *ahaṃkāra*, again both evolvent and evolute. *Ahaṃkāra* means the sense of me/myself. Until there is this sense of 'myself' there can be no sense of 'someone else'. I exist because someone else exists and vice versa. Until there is no sense of myself there can be no materialisation. Just as a painter has to be aware that he is good at painting before he can make any artistic creation. Practically, many artists realise that they are creative only after being told (by an external source) that they can be creative in a certain art form. So this sense of self-awareness, or *ahaṃkāra*, is necessary for all creation. This *ahaṃkāra* is of three types, viz., *sāttvika*, *rājasika*, *tāmasika*.

Sattva denotes light, luminosity, purity, knowledge.

Rajas denotes activity, mobility, motivation.

Tamas denotes darkness, idleness, aversion to knowledge as well as activity.

These three mutually oppose as well as mutually complement each other in some respects. The mobility and motivation of *rājasika ahaṃkāra* united with *sāttvika ahaṃkāra* gives rise to the five *jñānendriya* (cognitive senses), five *karmendriya* (connative senses) and the *ubhayātmaka manas* (mind) which is cogno-connative. *Sattva* is associated with knowledge/wisdom hence its part of the union leads to senses which help in acquiring knowledge.

The *jñānendriya* (cognitive senses) are:

śrotrendriya (sense of hearing) is *ākāśa* dominant

sparsanendriya (sense of touch) is *vāyu* dominant

caṅksurindriya (sense of vision) is *tejas* dominant

rasanendriya (sense of taste) is *āp* dominant

ghrāṇendriya (sense of smell) is *pr̥thvī* dominant

The *karmendriya* (connative senses) are:

vac karmendriya (tongue) performs *karman* (function) of speech

pāṇi (hands) perform the function of *grahaṇa/dhāraṇa* (holding)

pāda (legs) perform the function of *gamana* (moving)

pāyu (anus) performs the function of *utsarjana* (excretion of faeces)

upastha (reproductive organ) performs the function of sexual joy.

The motivation of *rājasika ahaṃkāra* united with the inactive *tāmasa ahaṃkāra* gives rise to the five *tanmātras*, viz., the *śabda tanmātra*, *sparsa tanmātra*, *rūpa tanmātra*, *rasa tanmātra*, *gandha tanmātra*. They in turn give rise to the five *mahābhūta*, viz., *ākāśa*, *vāyu*, *tejas*, *āp*, *pr̥thvī* respectively. The *mahābhūta* are also called as the *viśaya* (object). Any object is always idle and under cover of darkness until it is studied under

illumination by the concerned *indriya* (sense organ). A combination of these *mahābhūta* produces *dravya* (substances) with properties according to the dominance of the *mahābhūta* taking part in its creation.

As regards the *puruṣa* (individual), the entity that experiences or ‘reaps the fruits’ and is the final beneficiary /consumer is the *jīvātman* or soul. The *jīvātman* is thus the beneficiary of *jñāna*, knowledge acquired using the *jñānendriya* (the cognitive senses) as well as the *karma* or functioning of the *karmendriya* (the connative senses).

The process of *jñāna grahaṇa* (acquisition of knowledge) is as follows: the concerned *indriya* (sense organ) comes into contact with the *pāñcabhautika viśaya* (object of knowledge). This sensation is passed on to the *buddhi* (intellect), via the *manas* (mind). Intellect analyses this sensation and the fruit/ benefit of the particular knowledge is passed on to the *jīvātman*. A pleasant sensation causes joy while an unpleasant sensation causes sorrow. Consider an example of the use of *ghrāṇendriya* (sense of smell). The *ghrāṇendriya* comes into contact with a substance of a particular smell. This sensation is passed on to the *buddhi* via the *manas*. It is analysed by the *buddhi* and a resultant experience (whether pleasant or unpleasant) is passed on to the *jīvātman*. The *jīvātman*, being the end-user, experiences the joy (of pleasant smell) or sorrow (of unpleasant smell).

The process of ‘reaping the fruit’ (whether joyful or sorrowful), by the *jīvātman* due to the *karma* performed by the *karmendriya* is also a similar process. Consider the functioning of *pāyu* (anus). On performing the act of *utsarjana* (defaecation), aided by the *manas* (carrier of the sensations), the *buddhi* decides whether the *karma* performed was pleasant or unpleasant. A normal, healthy defaecation gives a pleasant experience of lightness, enthusiasm, etc.. Any abnormal defaecation (for example painful constipated defaecation) produces a sorrowful experience for the *jīvātman*.

When the *jīvātman*, which has individual existence in each individual body, is *lipta* (stuck) to experiencing /reaping the fruits of the *indriyas*, he senses the sorrow and joy of this material existence. When the

jīvātman becomes *alīpta* (un-stuck), experiencing /reaping the fruits of such senses becomes inconsequential to him, he attains self-realisation (*mukti*, liberation). This situation is characterised the unity of the *jīvātman* and the *paramātman*. Thus a realised soul is not inconsiderate of the fruits, he just regards them inconsequential. Just as there is a difference between ‘careless and carefree’ or ‘invaluable and valueless’.

In the *Taittiriyaopaniṣad* the sequence of *mahābhūta* formation is *ākāśa-vāyu-tejas-āp-prthivī*:

Ākāśa was formed first from the *śabda tanmātra*. This *mahābhūta* in collusion with *sparsa tanmātra* formed *vāyu mahābhūta* and so on. Thus,

Ākāśa is formed from *śabda tanmātra*

Vāyu from *śabda* and *sparsa tanmātra*

Tejas from *śabda, sparsa, rūpa tanmātra*

Āp from *śabda, sparsa, rūpa, rasa tanmātra*

Prthivī from *śabda, sparsa, rūpa, rasa, gandha tanmātra*

In other words, *ākāśa* has *śabda guṇa* only. *Vāyu* has *śabda* and *sparsa guṇa* both, and so on. Thus there is an increase in the *guṇa* along the line. This is called ‘*bhūtāntara praveśa*’. This is a concept that Ayurveda proposes further to the *Sāṃkhya* theory of evolution.

Interrelation between the above can thus be exemplified as under. There is a direct inter-relation between *tejas, cakṣurindriya* which is *tejas* dominant and *rūpa tanmātra* which generates *tejas mahābhūta*. One of the most important qualities of *tejas* is illuminance. This luminates the object to be seen. The *cakṣurindriya* comes in contact with the illumination from the object. After imbibing this ‘stimulus’, it comes in contact with the *manas* which in turn conveys it to the *buddhi*. The *buddhi* analyses it and passes on the fruit to the *ātman*, whether *anukūla* (likeable), in this case for example a beautiful sight, or *pratikūla* (dislikeable) which can be for example a disgusting sight.

Every *dravya* (substance) is *pāñcabhautika*, i.e., has all the *mahābhūta* present in varying degrees. The *dravya* is called or named by the most dominant of the present *mahābhūta*. Thus a *pārthiva dravya* is a *dravya*

or substance with all other *mahābhūta* in minor degrees but dominance of *pr̥thvī mahābhūta*. This is called *vyapadeśastu bhūyasam*. Every material substance in this universe is made up of all the five *mahābhūta* with varying percentages and qualities of each *mahābhūta*. There is thus no *dravya* which is purely *pr̥thvī* or purely *āp*, etc. Now let us consider each *mahābhūta* individually.

Pr̥thvī:

Pr̥thvī, or rather substances of *pr̥thvī* dominance, are *guru* (heavy), *khara* (rough), *kathīṇa* (hard), *manda* (opposite of sharp, piercing; also means slow acting), *sthira* (stable), *viśada* (dry, clean of any adherence), *sāndra* (dense), *sthūla* (macro or large). In respect to the *indriya*, they are *gandha guṇa bahula*, i.e., have dominance of smell sense cognition. *Pārthiva dravya* thus cause *upacaya* (building up / construction), *saṃghata* (binding), *gaurava* (heaviness), *sthairya* (stability). All the above mentioned are qualities and functions of *pr̥thvī* but it is not necessary that all of these be found in every *pārthiva dravya*. Some of these *guṇa* may be present or dominant while others may be absent.

Āp:

Āp, or *dravya* with *āp* dominance, are *drava* (liquid), *snigdha* (unctuous or oily), *śīta* (cold), *manda* (slow acting), *mṛdu* (soft), *picchila* (slimy), *sara* (fluid). They are *rasa guṇa bahula*, i.e., have dominance of taste sense cognition, as regards *indriya*. They cause *utkleḍana* (liquification or increase in the quantity of liquid), *sn̐cha-bandhana* (binding due to unctuous nature), *viśyanda* (secretion), *mārdava* (create softness), *prahlāda* (create joy/happiness). The last quality being attached more to the *manas*, (mind) but to the somatic as well.

After seeing *pr̥thvī* and *āp*, let us see an example of differentiation between the two. It is important at this stage as they are the main constituents of the *kapha doṣa*.

Consider an everyday example of gum. Gum is viscous, signifying an opposition or aversion to flow. It is dense thus *pārthiva*, or *pr̥thvī* dominant

but sticky due to the presence of the *snigdha guṇa* of *āp mahābhuta*. Gum is very sticky with less water content. If it is diluted with a lot of water, its stickiness reduces considerably, but it becomes slimy. Thus excessively sticky, *pṛthvī* dominant gum is *styāna* (sticky) while *āp* dominant gum is *picchila* (slimy).

Consider a patient with a *kaphaja* disease, in which his *kapha doṣa* is aggravated and he has, say, congestion; if the *kapha* congested in his upper or lower respiratory tract is too thick or *pārthiva*, it is *styāna*, sticks to the inner membranes of the tract and cannot be expectorated easily. It may need a bit of liquefaction for easy flow by *āp* dominant *dravya*, say *yaṣṭimadhu* (liquorice), which increases the *āp* content.

Tejas:

Dravya of *tejas mahābhuta* dominance are *ūṣṇa* (hot), *tīkṣṇa* (piercing or sharp), *sūkṣma* (micro or extremely small), *laghu* (light), *rūkṣa* (dry), *viśada* (dry, clean of any adherence). They are *rūpa guṇa bahula*, i.e., have dominance of sight sense cognition regarding *indriya*. They cause *dāha* (burning), *pāka* (*pacana*, digestion, transformation), *prabhā* (glow or radiance, usually associated with skin), *prakāśa* (illumination), *varṇa* (complexion/ pigmentation).

This takes us to *pitta doṣa*.

Let us have a case of *pitta* aggravation. The normal *cikitsā* in such cases is *śīta cikitsā* (cold treatment). Thus various substances that put out fire are used to reduce *pitta*, usually *pṛthvī* or *āp* dominant. Going by the *sāmānya-viśeṣa siddhānta*, that like increases like, *tejas dravya* would certainly be not used in *pittaja* aggravations. Consider an example of *ūrdhvaga āmlapitta*. It is a *pittaja* disease but one with a peculiarity. In this disease, the *pitta* aggravates not by its *tejas* component but by its *drava guṇa* or *āp* component, there being a volumetric increase in *āp*. The *pittaja* symptoms of burning sensation in chest/abdomen, sour eructations, etc. are common. *Āpya dravya* like milk, water, etc. being *śīta* (cold) do give temporary relief but in the long run they add to the *samprāpti* or pathogenesis by further increasing the *āp* volume. Please note here the peculiarity of *pāñcabhautika cikitsā*. Potently *tejas dravya* like garlic, which would normally have been

contraindicated in *pitta* diseases, are used. Being *tejas*, they cause *śoṣaṇa* of *āp mahābhūta*, thereby, reducing it volumetrically. Most of the symptoms are relieved. Such a *cikitsā* is possible due to further analysis of *pitta* into *tejas* and *āp*. *Pāñcabhautika* methodology is thus more precise and analytical.

Vāyu:

Dravya of *vāyu* dominance are *laghu* (light), *śīta* (cold), *rūkṣa* (dry), *khara* (rough), *viṣada* (dry and clean of any adherence), *sūkṣma* (micro or extremely small). They are *sparsā guṇa bahula*, i.e., they have dominance of touch sense cognition regarding *indriya*. They cause *rauṣya* (dryness), *glāni* (sleep due to exhaustion), *vicāra* (thought process), *vaiṣadya* (clean of adherences), *lāghava* (lightness or reduction in mass).

Ākāśa:

Ākāśīya dravya are *mṛdu* (soft), *laghu* (light or extremely low weight, as *ākāśa* is space), *sūkṣma* (micro), *ślakṣṇa* (smooth/fine). Pure *ākāśa* is absence of mass and hence there is no friction, resulting in smoothness. They are *śabda guṇa bahula*, they have dominance of auditory sense cognition as regards *indriya*. They cause *mārdava* (softening), *sausīrya* (smoothening), *lāghava* (lightness or reduction in mass).

Another important property associated with *ākāśa* is ‘*apratighāta*’, i.e., it does not block, cause obstruction. It is rather on the contrary. Let us see another example.

Aggravated *kapha* or *āma* can cause obstruction of body fluids in their *srotas* leading to their accumulation. Increased accumulation increases pressure. This is often seen in the eyes, where intra-ocular pressure increases from a variety of reasons and the drainage of the eyes is not proportionally sufficient. I have used just *kutakī tail* – oil prepared using *kutakī* (*Picrorrhiza kurroa*). This herb is typically ‘*ākāśa-vāyu*’ in composition and its use increases the qualities of *ākāśa* and *vāyu*. A few drops of this oil, applied with gentle massage on the *apāṅga marman*, which is lateral to the eyes, helps increase *ākāśa* or space of the drainage apparatus

of the eyes. Increased drainage evacuates the accumulated fluid, releasing the intra-ocular pressure and relieving the patient of associated headache.

Study of body on the basis of *mahābhūta*:

Garbhoṭpatti (formation of foetus):

The foetus is formed with the union of the *śukra*, *ārtava* and *jīvātman*. In males, the seventh *dhātu* is the *śukra*. *Suśruta* has termed the *ārtava* as *strī-śukra* (*śukra* in females). Also elsewhere in the *Sūtrasthāna*, he has mentioned that the *āhāra rasa* is converted in one month to *śukra* in males and *ārtava* in females, thus making it clear that *ārtava* is not to be confused with *rajas* (the menstrual fluid) which is the *upadhātu* (secondary or sub-*dhātu*) of *rasa*.

Śukra śoṇitaṃ garbhāśayaṣṭham ātma prakṛti-vikāra sammūrchitaṃ garbha iti ucyate / taṃ cetanāvasthitaṃ vāyurvibhajati, tejaḥ ena pacati, āpaḥ kledayanti, pṛthivī saṃhanti, ākāśaṃ vivardhayati / evaṃ vivardhitaḥ sa yadā hasta pāda ghrāṇa karṇa nitambādibhiḥ angairupetaḥ tadā śarīramiti saṃjñāṃ labhate / tacca śadāṅgam sākḥāscatastro, madhyaṃ pañcamaṃ, śaṣṭhaṃ śīra iti // Su. Śā, 5.2.

The union of *śukra*, *ārtava*, *ātman*, *prakṛti* (eightfold, viz., *prakṛti*, *mahat*, *ahaṃkāra* and five *tanmātra*), *vikāra* (sixteen, i.e., five *mahābhūtas*, five *jñānendriya*, five *karmendriya*, one *manas*) in the *garbhāśaya* (uterus) is called *garbha*. It is to be understood here that each of the components is essential for the formation of *garbha*. This foetus with *ātman* undergoes *vibhajana* (division) due to *vāyu*, *pacana* (transformation/processing) due to *tejas*, *kledana* (activity related to increase in fluids) due to *āp*, *saṃhanana* (density or strength) due to *pṛthivī*, *vivardhana* (growth in size) due to *ākāśa*. *Vāyu*, being associated with *gati* (speed/mobility), causes various activities, in this case division. *Tejas* is the *agni* component which helps in *pacana* and thus transformation and/or processing. *Āp* causes *kledana* that is making available water which wets various surfaces and also acts as a medium for *pacana*, etc. *Pṛthivī* causes conglomeration and thus increasing density,

sturdiness, etc. *Ākāśa* causes *vivardhana*, i.e., makes space available of this growing mass, increases the volume. As this process continues, and the mass grows and various organs like *hasta* (hands), *pāda* (legs), *ghrāṇa* (nose), *karṇa* (ears), *nitamba* (buttocks), etc., it is called *śarīra* (body). It has six components viz., four *śākhā* (extremities), *madhyama* (trunk) and *śira* (head).

All the five *mahābhūta* act simultaneously, supporting and complementing each other's functions. When it is said that '*pr̥thivī saṃhanti*', it is understood that '*saṃhanana*' is representative of the various *guṇa* of *pr̥thivī*. Thus *pr̥thivī* acts through all its *guṇa* viz. *guru*, *khara*, *kathina*, *manda*, *sthira*, *viśada*, *sāndra*, *sthūla*, etc., causing *upacaya*, i.e., building up (as in *dhātu upacaya* – building up of tissues, etc.), *saṃghāta* (binding together), *gaurava* (heaviness), *sthairya* (stability/sturdiness). All these *guṇa* will be expressed as, when and where necessary. Even if Mr. S is a father, husband, son, brother, member of a club, employer, etc., all at the same time, all his *guṇa* or qualities will not be displayed simultaneously but as, when and where the situation demands. Thus he may be a good father to his child, a loyal husband to his wife, a strict employer to his employees, etc.

Similarly, the other *mahābhūta* act through their *guṇa*. All the *mahābhūta*, thus, act complementary to each other and together form the body.

Various body components in accordance to *mahābhūta* (Ca. Śā.7):

Pārthiva components:

Those parts that are specifically large, stable, with specific shapes (thus not very elastic), heavy, rough, hard organs like nails, bones, gums, musculature, skin, faeces, hair, moustache, hair on the body, tendons, etc. are *pārthiva*, as also the nose or organ of smell.

Āpya components:

Those that are liquid, fluid, slow as also opposite of sharp, unctuous, soft, slimy for example body fluid, blood, fat, *kapha doṣa*, *pitta doṣa*, *mūtra* (urine), sweat, etc. as also the tongue or organ of taste.

Suśruta (Śā.1) has added *retas* (seminal fluid) to the list.

Tejas components:

Pitta, heat, radiance of the body are all *āgneya* or *tejas*, as also the eye or organ of sense of sight.

Suśruta (ibidem) has added *taikṣṇya* (sharpness) and *śaurya* (courage, a quality of the mind).

Vāyaviya components:

The air that we breathe, the movement of the eye lashes, i.e., opening and closing of the eyes, contraction, *prasaraṇa*, expansion or relaxation, movement with legs, motivation, holding power, etc., are *vāyu* dominant, as also the sense organ of touch.

Suśruta (ib.) has added *spandana* (vibration).

Ākāśīya components:

All spaces in the body large and small, all channels are *ākāśīya*, as also the auditory sense organ.

Suśruta (ib.) has added *sarva cchidra samūha* (group of all openings and orifices).

Thus we have seen the origin of *mahābhūta*, *pāñcabhautika* composition of various *dravya* and body components like *doṣa*, etc., application of *mahābhūta siddhānta* to diagnostics and *cikitsā* in brief.

CHALLENGES IN DEVELOPING MEDICINAL PLANT DATABASES ON AYURVEDA

Unnikrishnan Payyappallimana
Foundation for the Revitalization of Local Health Traditions
Bangalore

1. Nomenclature Correlation Database on Ayurveda

As part of a conservation project that was initiated by the Foundation for Revitalisation of Local Health Traditions, an NGO based in Bangalore, in Southern India in 1993, a database building activity was undertaken to understand what are the medicinal plants mentioned in the codified medical traditions such as Ayurveda, Siddha and Unani.

In the ayurvedic database, first effort was to build a database on correlation of Sanskrit names with botanical names mentioned in the secondary literature (non-classical).

The bibliographic sources for this activity included 21 books belonging to last 100 years of works by Ayurvedists, botanists and pharmacognosists attempting to correlate Sanskrit names with botanical names. This work ended in a correlation of around 20000 Sanskrit names to 1750 species belonging to 830 *genera*.¹

¹ F.R.L.H.T. database. These databases have been developed with a collective effort of many individuals. I acknowledge the relentless effort of Vaidya Ram Manohar, Dr. U. G. Gertha, Dr. S. N. Venugopal, Mr. Abdul Kareem and many ayurvedic college students. I also thankfully acknowledge continuous support of Sri D. K. Ved and Sri Darshan Shankar in this regard.

No	Name of the work	Author	Year
1	<i>Pharmacognosy of Ayurvedic drugs</i> Vol. 1, 2, 3, 10	K.N. Iyer, A. N. Namboodiri and M. Kolamallal	1951 1957 1979
2	<i>Harita Saṃhitā</i>	Alix Raisom	1974
3	<i>Aṣṭāṅga Hṛdaya Kośa</i>	Anonymous	1936
4	<i>Ayurvedic Pharmacopocia of India</i> vol. 1	Ministry of Health and Family Welfare	
5	<i>Ayurvedic Formulary of India</i> Part 1	Controller of publications	1978
6	<i>A Dictionary of Economic Products of India</i>	George Watt	1889
7	<i>Indian Medicinal Plants</i> 4 volumes	Kirtikar and Basu	1935
8	<i>Handbook of Medicinal plants</i>	P. N.V.Kurup	1968
9	<i>A Catalogue of Indian Synonyms</i>	Moideen Sheriff	1988
10	<i>Single Drug Remedies</i>	N. S. Moos	1976
11	<i>Gaṇās of Vāhaṭa</i>	N. S. Moos	1980
12	<i>Indian Pharmacceutical Codex</i> vol. 1	B. Mukherji	1953
13	<i>Indian Materia Medica</i> 2 vols	K. M.Nadkarni	1954
14	<i>Indian Medicinal Plants</i> 1-5 vols	S. Raghunath Iyer	1993-96
15	<i>Dravyaguṇavijñāna</i> vol. 2 & 5	P.V.Sharma	1994
16	<i>Ayurvedic Drugs and their Plant Sources</i>	Sivarajan and I. Balachandran	1994
17	<i>Glossary of Vegetable Drugs in Bṛhatrayi</i>	Thakur Balwant Singh & Chunekar	1972
18	<i>Nighaṇṭu Ādarsa</i> vol. 1 & 2	Vaidya Bapalal	1968
19	<i>Some Controversial Drugs of India</i>	Vaidya Bapalal	1982
20	<i>Studies on Medicinal Plants in Dhanvantariya Nighaṇṭu</i> vol. 1	Vaidya D.K.Kamat	1972
21	<i>Materia Medica</i>	Whitelaw Ainslie	1984

Source: FRLHT databases

An interface has been developed with the structure shown in the Screen 1.

2. Challenges

A number of nomenclature correlation related issues came out of building up of this database. Ayurveda follows polynomial system of nomenclature. In this system, a plant is identified through multiple names. Each of these names pertains to a specific character or feature of the plant. When all the names are grouped together, one gets a picture of the plant. For example *guḍūci* which is correlated to *Tinospora* has around 70 names described in the classical literature. *Amṛtā*, *somavallī*, *somalatikā* (climber

with nectar like properties), *cakralakṣaṇā* (having wheel like appearance in cross section), *maṇḍalī* (circular), *kuṇḍalī* (with an entangled nature), *nāgakumārī* (young snake like appearance), *tantrikā* (spreading nature), *chinnaruhā*, *chinnodbhava*, *chinnangi* (grows when cut and put in the soil), *śyāmā* (with a bluish black colour), *rasāyanī* (rejuvenative), *vayasthā* (age regulating), *jīvantī* (life promoting), *jvarārī* (pacifying fever) etc. (Manohar 1994). In this system of polynomial nomenclature same names are used for different plants as well. For example *kṛṣṇa* is the name for *pippalī* (*Piper longum*) as well as *arjuna* (*Terminalia arjuna*). As there are multiple names and common synonyms it was difficult to decide which has to be taken as the basic name for a plant. This issue was not addressed by any of the authors in the bibliographic sources that we used for the database. Thus we found that many of the correlations were casual and non-critical of Sanskrit names with botanical names by these authors without having sufficient referencing or voucher specimens of the plants. Confirming the identity through descriptions was also not done in majority of these works.

An author from a particular region would correlate a plant that is in current use for a particular name in Sanskrit. For example for the plant *śaṅkhaṇḍī*, a Kerala author would give *Clitoria ternatea* as the correlation, where as a North Indian author would correlate to *Convolvulus microphyllus*. Thus there was a problem of multiple botanical species being correlated to a single plant. These are two examples of multiple number of botanical species correlated to the same name.

* *Śaṅkhaṇḍī*

1. *Clitoria ternatea*
2. *Evolvulus alsinoides*
3. *Convolvulus microphyllus*
4. *Canscora decussata*
5. *Canscora diffusa*
6. *Lavendula bipinnata*
7. *Cannabis sativa*
8. *Xanthium strumarium*

*** *Pāṣāṇabheda***

1. *Aerva persica*
2. *Aerva lanata*
3. *Ammania baccifera*
4. *Bergenia ciliata*
5. *Bergenia stracheyi*
6. *Bridelia montana*
7. *Bridelia retusa*
8. *Didymocarpus pedicellata*
9. *Homonoia riparia*
10. *Kalanchoe pinnata*
11. *Nothosacra brachiata*
12. *Ocimum basilicum*
13. *Plectranthus amboinicus*
14. *Rotula aquatica*

There are various reasons for these multiple correlations and I will not go into the details of that in this presentation.

Another problem was relating to transliteration of Sanskrit names. As the Sanskrit names when transliterated into English were spelled by different authors differently, there were a number of additional Sanskrit names, which were not correct. There needed some kind of standardization in the transliteration. In-depth understanding of ayurvedic plant nomenclature was lacking among these authors. Thus an in-depth study of ayurvedic classical texts with their chronological linkages was necessary to address issues related to nomenclature correlation and controversial identity. This led us to building of a classical literature based database.

3. Bibliographic Database Based on Classical Literature

The next effort was to develop a bibliographic/reference database based on primary sources, i.e., the classical texts of Ayurveda. [Refer to

Screen 2] For this purpose, 20 classical texts covering a chronological period of around 2200 years were prepared. The texts selected are major milestones in the area of *dravyaguna* (ayurvedic pharmacology), they are in contemporary use and cover various types of texts like *saṃhitā* (treatises), *saṃgraha* (compendiums), *nighaṇṭu* (lexicons). This also tried to cover different geographical locations to get maximum variations in the usage of plants.

Bibliographic References for the Database:

S N.	Text name	Chronology	Author	Region	Plant ref.
1	<i>Carakasamhitā</i>	1500BC-400AD	Agniveśa Caraka Dṛdhabala	Himālaya Kāśmīra	12882
2	<i>Suśruta Saṃhitā</i>	1500BC-500AD	Suśruta Nāgārjuna	Kāśī Sindhudeśa	9650
3	<i>Aṣṭāṅga Saṃgraha</i>	500 AD	Vāgbhaṭa	Sindhudeśa	20500
4	<i>Aṣṭāṅga Hṛdayam</i>	600 AD	Vāgbhaṭa	Sindhudeśa	9900
5	<i>Aṣṭāṅga Nighaṇṭu</i>	800 AD	Vāgbhaṭa		2100
6	<i>Paryāyaratnamālā</i>	900 AD	Mādhava	Śīlāhrada	1900
7	<i>Dhanvantari Nighaṇṭu</i>	200AD-1000AD	Unknown	Unknown	3250
8	<i>Cakradatta</i>	1075 AD	Cakrapānidatta	Vaṅgadesa	12300
9	<i>Dravyaguṇasaṃgraha</i>	1075 AD	Cakrapānidatta	Vaṅgadesa	320
10	<i>Mādhavadravyaguna</i>	1250 AD	Mādhava	Unknown	750
11	<i>Śārṅgadhara Saṃhitā</i>	1300 AD	Śārṅgadhara	Devagiri	4200
12	<i>Nighaṇṭu Śeṣa</i>	1200 AD	Hemacandra	Unknown	2950
13	<i>Siddhamantra</i>	1210AD-1247AD	Keśava	Unknown	950
14	<i>Hṛdayadipaka Nighaṇṭu</i>	1260AD-1271 AD	Bopadeva	Unknown	820
15	<i>Madanapāla Nighaṇṭu</i>	1374 AD	Madanapāla	Kāṣṭhanagara	3000
16	<i>Bhāvaprakāśa</i>	1550 AD	Bhāvamiśra	Kāśī Kanyākubja	11200
17	<i>Bhāvaprakāśa Nighaṇṭu</i>	1550 AD	Bhāvamiśra	Kāśī Kanyākubja	2600
18	<i>Rāja Nighaṇṭu</i>	1700 AD	Naraharipaṇḍita	Kāśmīra	7300
19	<i>Śāligṛāma Nighaṇṭu</i>	1896 AD	Śāligṛāma vaiśya	Murādabad	4200
20	<i>Siddhabhēṣajamanimālā</i>	1896 AD	Kṛṣṇaramabhāta	Jayapura	620

Source: FRLHT databases

Structure of the Bibliographic/reference (*Nāmajñāna*) Database

Following were the fields in the database.

- Sanskrit name
- Plant/animal/mineral/metal
- Gender
- Whether plant, plant part, product, group, relation with time, space
- Chapter
- *Sthāna* (Section)
- Verse

The field Sanskrit names pertained to resource name, which was classified into plant, animal and minerals and metals. Specific gender in which the Sanskrit name was used was important as some names in female gender pertain to tender climbers and the same name in male gender meant trees. For example, *amṛtā* (*Terminalia chebula*), *amṛta* (*Tinospora cordifolia*). To differentiate this gender was taken as a separate field. Plant part, products, groups were differentiated by tags. Similarly time relations for example *kadali phala – pakva* (ripe), or space relation for example *jala – sahyaja* (water from Western ghats), etc., were classified.

The objective of this database was to collect primary information from classical texts on the number of medicinal plants described in Ayurveda. At present this consists of around 23000 Sanskrit names relating to 122000 references across 20 texts. Tentative botanical correlation with pictures based on the earlier database and interface facility of searching references from individual texts, across texts, synonym and basonym search has been created.

This database now helps in analyzing and searching the data for research purposes. It was found that around 70% of the materials used in Ayurveda are plants, 20 % animals and 10% minerals. This was an analysis of *nighaṇṭus* of medieval period. (Unnikrishnan 1997)

4. Challenges faced

A number of challenges were faced during development of this database. One of the challenges was selection of texts. The question was what can be defined a classical text. It was decided that Sanskrit literature that have not incorporated modern views, ideas or botanical correlations could be selected for this purpose. Another criterion was that the text has to be in mainstream and used in different parts of the country. It had to also cover major chronological milestones so as to incorporate various temporal ideas and different geographical locations to cover variations spatial ideas.

Different publications of these texts carried different *śloka* numbers or even differences in the verses. Thus critical editions were needed. Collecting critical editions of classical literature and ascertaining time periods of these classical texts were difficult. For standardizing this *mūla granthas* (text with only verses) or those with Sanskrit commentaries and widely accepted publishers' books were selected.

There were grammatical issues that needed to be solved. As mentioned earlier variations in gender or a *pratyaya* (suffix or prefix) changed the identity of the plant name completely. For example *pippalī*, *pippala*, *mṛṇāla*, *mṛṇālī*, *amṛṇāla*, *venu*, *venī*, *madhuka*, *madhūka*, *pataṅga*, *pattaṅga*, *padma*, *padmā*, *ariṣṭa*, *ariṣṭaka*, *nyagrodha*, *nyagrodhī*, *parpaṭa*, *parpaṭakī*, *palāśa*, *palāśā*, *sarala*, *saralā*, *sāla*, *śālī* are some of the typical examples.

Differences of names across different time periods, was another problem. For example *kokilākṣa* is the name used for *ikṣuraka* by Suśruta, *bhūmyāmalakī* is the name for *tāmalakī* and *caḁṣuṣya* for *kulathika* by *nighaṇṭu* authors. Yet another issue was collecting commentators' views on a plant, its identity, etc. It was understood that there are number of instances where there were difference of opinion among different authors and there were often gaps in the textual descriptions, which made the issue complex.

Same plant names were used in different variant forms. For example *yaṣṭi*, *yaṣṭika*, *yaṣṭika*, *yaṣṭiahvika*, *yaṣṭimadhuka*, *yaṣṭimadhūka*, *madhuka*, *madhuyaṣṭika*, *madhuyaṣṭi*, etc., pertain to the same name *yaṣṭimadhu*. These variations had to be considered. There were a number of

synonyms used in the same text in different context. Since the effort of this database was to prepare a unique list of plant names from each of these texts, it was necessary to group the variants and synonyms of each plant and link it with a basic name. This had to be done by grouping the number of references.

Since the plants had a number of names in the same text, grouping of synonyms had to be done. This was found difficult without having complete descriptions and commentators view on each plant. While grouping the references, contextual differences had to be considered. For example, in some context *kuṣṭha* means a skin disease where as elsewhere it means a plant. Similarly the name *tikta* means bitter as well as the plant *katukā* and *kirātatikṭā*. So these references had to be screened carefully.

In the name grouping, another difficulty was that of classification on part used. At times the part used has a different name altogether which is considered as an entity. For example – *mocarasa* is the exudate of *śālmali* and it is mentioned as a different entity. Similarly the dry *ādraka* is mentioned as *śuṇṭhī* (dry ginger). Such references had to be identified and grouped separately. As mentioned earlier, same names are used in the classical texts for denoting different plants. For example, *uṣṇa* is a name used for *pippalī* and *marica*, *kṛṣṇa* for *pippalī* and *aṛjuna*, *citrā* for *urūbuka*, *cranḍa* and *daṇṭī*, *tiktā* for *katurahiṇī* and *kakatikṭa*, *amṛtā* for *guḍūcī* and *harītakī*. In this case each reference had to be searched for such common names and synonyms.

According to *Dhanvantariyanighaṇṭu*, all these features in the classical texts are owing to the nomenclature system, which is designed based on *jātiliṅga* (reproductive characters), *ākṛti* (physicial characters), *varṇa* (colour), *vīrya* (potency), *rasa* (taste), *prabhāva* (specific action), etc. It is mentioned that common synonyms have to be decided according to the meaning, context, tradition (*saṃpradāya*, *parampara*) and reasoning (*tarka*). Thus each contextual reference became important.

Another limitation was that the bibliography selected for this work did not represent the regional literature in which a plethora of knowledge is available. Thus this is not a comprehensive inventory yet. Some plants that are commonly used at present in Ayurveda did not appear in this database.

For example – *saptacakra* (*Salacia oblonga*) is described in Kerala traditional literature but it did not appear this in the database, as regional literatures were not included. Around 200 such materials that are unique in their usage in Kerala tradition is documented in *Dhanvantari*, a journal that was published from Arya Vaidya Sala, Kottakkal, a few decades ago. But many of these plants may have not come in this database.

Another major challenge was correction of data after compilation. Intricacies in classifying references into *guṇakarma* (qualities and actions), *varga*, *yoga*, *gaṇa* (different therapeutic and non-therapeutic groups), *kalpana* (pharmaceutical preparation), *prayoga* (clinical application) groups was yet another issue. Similarly classifying into *svarūpa bodhaka* (revealing form), *guṇa bodhaka* (revealing quality), *karma bodhaka* (revealing action) names, was also a challenge. This was essential to understand the specific context. All these were identified as key issues to be looked into for preparing an inventory of medicinal plants in classical texts of *Ayurveda*.

Lack of proper software in Sanskrit language also became a big hurdle. The GIST software for Sanskrit language was not Windows compatible for database operations. Lack of good software for database operations in Sanskrit remains an unsolved issue even today.

These challenges were identified during the effort to make the classical text database. Even after completion of this database, the major issue of critical nomenclature correlation remained unsolved. It was learned that this issue of nomenclature correlation could be solved only by a combination of approaches such as in-depth studies of classical literature, documentation of understanding of living *vaidyas* (practitioners) and pharmacognostic and pharmacological studies. To solve some of these issues a mere reference database was not sufficient. It had to have all the contextual details explained in each of these references. Only then studies on individual drugs could be taken up. Thus building of detailed individual text databases was initiated. This included databases of *Bṛhatrayi* – *Carakasamhitā*, *Suśruta Samhitā*, *Aṣṭāṅga Hṛdaya* - and *nighaṇṭus* – *Dhanvantari Nighaṇṭu*, *Madanapāla Nighaṇṭu*, *Bhāvaprakāśa Nighaṇṭu*, *Rāja Nighaṇṭu*. [Refer to Screens 3 and 4]

5. Classification of synonyms

After building individual text databases, following steps were done to find out the unique plants in each of these texts.

- Collection of plant references
- Collection of commentators' views on references
- Fix tentative basonym – based on commentary, frequently used names
- Mark grammatical variants linked to basonyms
- Mark synonyms based on suggestions of commentators
- Mark gender variations
- Mark plant names which pertain to groups *triphalā*
- Mark plant names as basonyms if the plant name correlated by the commentator is not found marked under synonym or variant name
- Mark tentative basonyms as basonyms if they are not linked to synonyms or variant names
- Give exceptions in case of popularly used synonyms – e.g., *guḍūcī*, *amṛtā*
- Compare botanical correlations done by subject experts
- Fix status of identification by giving flags liked non-controversial, controversial or unidentified based on these studies

This analysis has now culminated in the following data in *Carakasamhitā*. There are 12870 references related to plants in *Carakasamhitā*. After grouping the synonyms there are 617 unique plant names. Out of this 508 are identified and they are correlated to 630 botanical species. There were around 500 synonyms, 817 variants, 56 group names in *Carakasamhitā* (Venugopal 2001).

Out of this there are 305 names are non-controversial, 205 are controversial and 107 are unidentified. Based on the other databases at the Foundation for Revitalization of Local Health Traditions (FRLHT), it is understood that 56 plants in *Carakasamhitā* are having some threat status and falling under endangered list. There are around 1630 formulations recorded in *Carakasamhitā*. Now this has become a unique inventory of plants of *Carakasamhitā*.

Now similar works are carried out in other texts also and it is expected that in a few years time we will be able to arrive at a better picture of plants of Ayurveda.

Apart from this, similar works are being done on Siddha and Unani systems of medicine, as part of this project. Number of other databases on local health traditions supporting references, traditional quality standards, immunology, malaria, *pañcakarma*, home doctor, clinically important medicinal plants, distribution of medicinal plants, threat status, propagation and agro-technology, herbarium, trade, pharmacognosy and pharmacology are being developed in the organization. All these are linked to a master nomenclature correlation database having various systems of medicines including the secondary works done on the folk traditions. This is having 7325 medicinal plants with references with 103763 vernacular names from 13 languages. These databases serve purposes of conservation, education, research, clinical practice, industrial production, intellectual property right issues, primary health care through home remedies, local health traditions assessment and promotion programs.

Conclusion

During the process of developing these databases it was understood that the nomenclature correlation of Sanskrit names of ayurvedic classical literature to botanical names was a complex task. Casual and non-critical approach in correlation has led to the problem of controversial and multiple botanical identities for a Sanskrit name. Only a systematic approach taking into consideration the available classical textual literature, their critical commentaries, experiences of living traditions combined with pharmacognostic and pharmacological works, can shed light on this and solve the issue to some extent.

Bibliography

Manohar, R. (1994) *Nomenclature Taxonomy of Vṛkṣāyurveda*, Coimbatore, Lok Swasthya Parampara Samvarshan Samithi.

Unnikrishnan, P.M., (1997) “The Agony of the Golden Goose” in *Amruth*, Feb, 1997. Bangalore, Foundation for Revitalization of Local Health Traditions.

Venugopal, S.N. (2001) *Medicinal Plants of Carakasamhitā* – a close up in *Amruth*, vol 5, issue 3 June-July 2001, pp. 5-14

FUTURE DIRECTIONS IN THE DEVELOPMENT OF AYURVEDIC PRODUCTS

R. Kumar

Jawaharlal Nehru Centre for Advanced Scientific Research
Bangalore

Introduction

Ayurveda is one of the earliest frame works which correlated conditions of sickness (deviations from health) to their causes and healing practices through a "cause and effect" approach. When this system was developed, the notion of "molecule" as it is understood today did not exist. Nor were the definition and role of "cell" known in life processes. The discovery of DNA and functional genomics was more than three thousand years away. Thus the terminology Ayurveda used for describing sicknesses and their causes does not have one to one correspondence with that expressed through contemporary biology. That does not, in any way, diminish the efficacy of its treatment. In fact, this system of health care continues to be vibrant in India – and its practice is flourishing. Most Indians consider it to be the treatment of last resort for long standing degenerative and metabolic disorders. There is a general belief that when all other treatments fail, ayurvedic treatment can still succeed (and often does!).

Most of the ayurvedic formulations are polyherbal in nature. Traditionally, the ayurvedic practitioners used to collect the ingredients required, prepare the medicine according to the need of the individual patient and dispense it. Even now, a few practitioners follow the above practice (some maintain their own herbal gardens). The majority however depends on manufactured preparations available off the shelf. There are a number of manufacturers in India, who combinedly market around one thousand ayurvedic preparations. Apart from generating competition among the manufacturers, this development also has helped in making all preparations available in each region, irrespective of whether the required

raw materials are available in that region or not, thus offering wider choice to the ayurvedic practitioners. Further, these products, have also a "stand alone" value and can be investigated, modified and used in a fashion independent from the philosophy of Ayurveda.

Same is the situation with other preparations of herbal origin which are available from other traditional systems of medicine. Most of these preparations, belonging to different traditional systems, contain large number of molecules and their mechanism of action is normally not explained through modern biology.

In comparison to these are the 'active molecule' based therapeutics used by Allopathic system of medicine. These formulations, normally based on single active molecules, are strongly dependent on contemporary biology and chemistry. The acceptability of the allopathic system and its preparations has been high because it depends on rigorous testing for both efficacy and safety. However these preparations have not been able to replace those based on traditional systems. On the contrary, herbal preparations are increasingly being preferred over single synthetic molecules, because of the increasing belief that they are both benign and effective. This belief is further strengthened by a report¹ that adverse reactions to prescription drugs form fourth to sixth leading cause of death in USA, just behind heart diseases, cancer, etc.

Herbal therapeutics, either already existing or entirely new ones, are likely to become increasingly popular internationally. They may be used by any system of medicine provided they conform to the testing protocols required by that system. Thus any product, irrespective of the system from which it originated, may be used by more than one system of medicine in its original or modified form. Some of the major players in the area of single molecule based drugs have also started working on herbal preparations primarily for allopathic system.

¹ Lazarou J., Pomeranz B.H., and Corey P.N., "Incidence of adverse drug reactions in hospitalized patients", *Journal of American Medical Association* (1998) 279, pp.1200-1205.

The increasing demand for benign preparations of herbal origin is surely going to widen the scope of use of ayurvedic products not only by the practitioners of its own philosophy but also by the practitioners of other systems of medicine including the allopathic system. The purpose of this paper is to analyse the developments in ayurvedic products already taking place and those which are beginning to be investigated. Based on these developments and the emerging scenario in other systems of medicine, an effort is made to speculate on long term evolution of ayurvedic products.

1. Motivation for further development of ayurvedic products

The two core strengths of ayurvedic system are individual specific treatment and benign herbal products. Internationally, herbal products are available from not only Ayurveda but also from other traditional systems. Even allopathic system will have herbal products in future, for which a beginning has already been made. Thus there is likely to be intense competition among products designed through various systems for the same diseases. The final choice naturally will be based on efficacy, safety, reproducibility over wider patient population, mechanism of action (if known), and cost of the therapeutic agent. It is with respect to these parameters that the future preparations will be evolving. Only those products will finally find acceptance which are found to be more effective and safer through the use of contemporary biology and chemistry even when they have been designed through traditional systems of medicine.

2. New directions in ayurvedic products

In future, ayurvedic products, being herbal, are likely to be used on a much wider canvas than hitherto. Three directions are discernible in the development of these products. Firstly the existing products are getting better characterised chemically. Some of them are being slightly modified. Secondly entirely new disease specific preparations are being designed for various conditions of sickness, tested in a systematic way and the resulting

intellectual property rights are being protected. Thirdly,² special ayurvedic therapies as well as some of the concepts arising out of its practices are being investigated in a fashion that they can be exploited by other systems of medicine as well. Products falling in this category have to be tested very rigorously.

Efforts in this direction are just being initiated in various laboratories and results are likely to be available only after a few years.

3. Characterisation and modification of existing ayurvedic products

Ayurvedic products are based primarily on plant materials. The composition of a plant species may change with location, season, and even time of the day. These can bring about major variations in the effectiveness of a preparation. Further, it is not unusual that poorly identified plant parts get incorporated during manufacture. To ensure consistency of the product from batch to batch, (and also among various manufacturers), there is an increasing effort on the part of the industry to generate a chemical profile through HPLC of the product and ensure that different batches of the same product have HPLC profiles falling within a given band. There is also greater effort to avoid contaminants like pesticidal residue, heavy metals, fungi, and microbes, etc.

The efforts to prove efficacy and safety however are still minuscule. In some of the products of Ayurveda, the classes of active compounds are known. This knowledge has given rise to modified ayurvedic products, which contain these classes of compounds in higher concentrations. Such results have normally been achieved by preferential extraction, through choice of appropriate solvents.

² Kumar R., "How to globalise Ayurveda, Siddha and Unani" (Part I), *Chemical Industry News*, June (2000), pp. 561-563 and (Part II) July (2000), pp. 675-677.

4. New ayurvedic preparations

4.1. Optimised preparations

Most of the ayurvedic preparations are polyherbal. Protocols are now available which can quantitatively indicate the efficacy of a preparation. Using these protocols and through appropriate design of experiments, it is possible not only to know the contribution of individual herbs but also the interactions among them. Many preparations of Ayurveda are supposed to work through synergism. The future optimised ayurvedic preparations will strongly depend on synergism. Their action will be quite distinct from single molecule based drugs as the ayurvedic preparations will be acting through multiple mechanisms. Thus new preparations will be synergism based, exploiting many molecular mechanisms, and their compositions optimised through objective testing.

4.2. Constitution based preparations

Ayurveda prescribes treatment based on the constitution of the individual. Thus for the same disease Ayurveda offers a number of preparations. Many such new constitution specific, synergism based optimised products, designed entirely through the wisdom and philosophy of Ayurveda are likely to be available in future. Similar notion is also used in nutrition, where people are categorised through metabolic profiling.³

4.3. Transnational ayurvedic preparations

At present the ayurvedic products are based on plants grown primarily in India. With increasing globalisation, plant materials from other parts of the world as well as their ethnobotanical information will become available, increasing the basket of raw materials from which new

³ Tarabilda E. F., *Ayurveda Revolutionized*. Delhi, Motilal Banarsidass Publishers, 1997, p. 153.

preparations will be designed based on ayurvedic principles. These transnational products are likely to be more efficacious. For example, it is known that for rejuvenators, Ayurvedic products are based on *śvāgandha*, *shilajit*, *amla*, etc., whereas Chinese system uses *ginseng*, *rehmannia*, *foti*, etc. Similarly the Western system recommends licorice, confrey root and slippery elm. It is quite possible that the best rejuvenator based on possible synergism may involve the use of herbs from more than one country. Thus future preparations are likely to be an optimised mix of components of plant material from all over the world. However, the preparations will be designed through ayurvedic wisdom.

5. Stand alone preparations based on Ayurveda

5.1. Trimmer, molecularly defined preparations

An extract from even a single plant has large number of molecules, only a few of which may be effective as therapeutics. Some of them may bind with toxins, some others may be toxic themselves, whereas others may be merely fillers. Further, some of the molecules may be functioning synergically as there can be many targets for the same disease. It will be worthwhile to remove toxic and filler molecules thereby making the product trimmer. For example, in future an ayurvedic product may be a mixture of specific fractions of plant extracts rather than whole extracts. Not only those products will contain less number of molecules, but the role of fractions and their interactions will be better characterised. Preparations based on extract fractions will not only be accepted by ayurvedic practitioners but by other systems of medicine as well provided they have been processed through rigorous testing procedures required by those systems. Such preparations will still contain a number of molecules, all of natural origin. In most cases these products would be molecularly defined in that the molecules present will be known, though the role of each may not be clear.

Further, new preparations of Ayurveda would be required to be tested for toxicity in a much more rigorous way. This will result in the use

of entirely new plants, globally available, which have not been conventionally used by Ayurveda.

With the testing procedures available now, it is quite possible to find new uses for existing ayurvedic products. This is quite common for single molecules where multiple uses have been found for many existing drugs. As ayurvedic preparations contain many molecules, the chances of finding multiple uses for them are much higher. Explaining these uses through the ayurvedic framework will help in designing even better products based on ayurvedic philosophy.

6. Bioenhancers, a new concept from ayurvedic practices

A large number of ayurvedic preparations, used for diverse conditions of sickness, use *trikatu* as a common part of such preparations. *Trikatu* is a mixture of equal parts of long pepper (*Piper longum*), black pepper (*Piper nigrum*) and ginger (*Zingiber officinalis*). It was discovered by Atal *et al.*⁴ that these herbs increase the bioavailability of a number of drugs manyfold. They further showed that a single molecule 'piperine' in this preparation was acting as a bioenhancer. It is now known that this effect is present for many drugs, though not to the same extent. The bioenhancing effect of piperine on rifampicin in the treatment of tuberculosis is at an advanced stage of clinical trials. Investigations indicate that for this particular bioenhancer-drug pair, the bioenhancer increases the rate of absorption, reduces metabolic rate of the drug in the liver and increases the inhibition of the pathogen⁵ by the drug. It may also inhibit the pathogen through immunomodulatory effect. New results obtained at RRL, Jammu, indicate that 'piperine' is not an isolated example. Instead, a number of ayurvedic additives have been found to yield effects of this nature for a

⁴ Atal C.K., Zutshi U. and Rao P.G., "Scientific evidence on the role of Ayurvedic herbals on bioavailability of drugs", *Journal of Ethnopharmacology* (1981), 4, pp. 229-232.

⁵ Balakrishnan V., Varma S. and Chatterji D., "Piperine augments transcription inhibitory activity of rifampicin by severalfold" in *Mycobacterium smegmatis*, *Current Science* (2001), 80, pp. 1302-1305.

variety of drugs used for different diseases. It is also recognised that bioenhancers may be working through a number of different mechanisms. Thus, it is likely that in future there will be bioenhancers based on practices of Ayurveda, which will be used for drugs which are i) very toxic, ii) used over long periods, iii) very expensive and iv) about to become free from patent restrictions but are still in great demand. They will also be used for herbal preparations.

It is quite conceivable that for a single drug, there could be a number of bioenhancers, each acting through a different mechanism. If they do not biologically interact with each other, their mixture will form a 'composite bioenhancer'. Such 'composite bioenhancers' may eventually find application as parts of formulations in the treatment of difficult diseases like cancers, AIDS, Parkinson and Alzheimer diseases, arthritis and other auto-immune diseases, osteoporosis along with diabetes and cardio vascular diseases.

7. Special therapies of Ayurveda

Because of the holistic approach of Ayurveda, it offers special treatments not encountered in many other systems of medicine. Some of these are discussed below.

7.1. Detoxifiers

As Ayurveda considers diseases to result from accumulation of toxins, it has a full fledged branch on detoxification, in which special, elaborate procedures called *pañcakarma* are followed. These had gone out of use for some time but are increasingly being employed again. The two main methods of detoxification are through the digestive tract and skin though other techniques are also used. Though serious detoxification procedures require special expertise simple detoxification procedures can be followed by most. The products employed for detoxification may find use in future for maintenance of good health. The acceptability of these products

will strongly depend on proving their efficacy on the one hand and the mechanisms through which they work on the other.

7.2. Preparations for combotherapy

Most treatments of Ayurveda simultaneously treat and protect. Some of them can indeed be useful for quicker recovery and less side effects when taken along with drugs based on single molecules. A class of very special preparations called 'rejuvenators' act as hepatoprotective and immunomodulators along with showing antioxidant effects. Such products not only enhance recovery rate but can also be taken daily to maintain improved quality of life.

Ayurveda will also provide specific preparations based on its philosophy as convalescence promoters as well as toners for individual organs, after they have been rigorously tested through contemporary techniques.

7.3. Functional foods

Ayurveda puts considerable stress on the kinds of food which may be taken during various treatments. This practice is indeed showing signs of confirmation at least for some diseases. It is quite likely that these foods as well as food additives will form an adjunct treatment along with the use of therapeutics.

8. Special preparations of Ayurveda

Nearly ten percent of ayurvedic preparations, called '*bhasmas*' are based on metals or minerals, which are incinerated with special herbs at high temperatures. The final products are in the form of powders which are either used alone, or with other herbs. The metals and compounds normally used in these preparations are lead, tin, sulfur, iron, arsenic, mercury, gold, potassium nitrate, lime, etc. An off shoot of Ayurveda called *Siddha* system uses much higher percentage of such preparations.

Though the ayurvedic and *Siddha* practitioners vouch for their safety, it is necessary that these products be tested for their toxicity, as many of them have oxides as their main, though not necessarily active, components. In case their toxicity is acceptable, these could be tested for diseases for which existing drugs are highly toxic.

9. Packaging

Manufacturers of ayurvedic products have adopted quite modern methods of packaging, though not for delivery systems as yet. Already those products (powders) of Ayurveda which do not occupy very high volume per dosage are available in the market as tablets or capsules. This makes them more acceptable to the patients because they overcome, to a great extent, the problems of unpalatable tastes and odours. Further improvements in packaging are likely to continue. For example, many *cūrṇas* contain a lot of inert cellulosic material. These may be extracted and dried around room temperature and provided in tablet or capsule form in case their efficacy is not adversely affected by this procedure.

Further, preparations which are now offered as aqueous extracts may be freeze dried and the resulting solid offered in acceptable form. However, these forms of preparations are likely to be introduced only if they have no adverse implication for absorption or other pharmacological behaviour.

Special delivery systems like controlled release or targeting specific organs are other directions which the ayurvedic preparations may take in future. Apart from these, special toning and rejuvenating preparations may become available as food additives.

Conclusions

From the changes which are already discernible, the future ayurvedic products will be the result of integrating contemporary knowledge of biology and chemistry with the philosophy of Ayurveda.

The existing preparations will be better characterised chemically and biologically and their safety assured. Most future preparations will be trimmer, molecularly defined and will incorporate synergism as an important feature. They will be based on international rather than Indian bioresources, and will be exploitable both by Ayurveda (through whose philosophy they will be designed) and other systems through whose protocols they will be additionally tested.

Special preparations of Ayurveda will be used in combotherapy for reducing side effects, accelerating recovery and maintaining overall good health as well as that of individual organs. Ayurvedic foods and detoxifiers will be the other niches for future ayurvedic products. Finally, bioenhancers based on ayurvedic practices will be increasingly used particularly as composite bioenhancers.

With these core strengths, ayurvedic products are most likely to contribute significantly to the health care of the world in future.

EFFECT OF KERALA SYSTEMS OF *SNEHANA* AND *SVEDANA KRIYĀS* IN DEGENERATIVE DISEASES

P. M. Varier*
Arya Vaidya Sala
Kottakkal

Introduction

Degenerative diseases are a major cause for concern for the modern man. This is caused by the structural and functional impairment of the cell or tissue. And it is progressive in nature. There are physiological causes for this affliction occurring at an advanced age. Even those in the younger age group are found these days to be afflicted by this grave ailment. In this case, the etiology is not fully understood. What is known is that there is invariably a deteriorating change that takes place in the structure of a cell, a tissue or an organ.

Degeneration has been defined as a retrogressive alteration occurring in the cell or tissue in the process of sickness or injuries resulting from direct toxic action or secondary metabolic effects.¹

A cure or even management of degenerative diseases has been found to be an extremely difficult task by the modern medicine. The situation is not any different in the case of Ayurveda. The Keralite treatment modalities based on *snehana* and *svedana* are just a set of tools in the ayurvedic armament for attempting to manage the disease condition. The *snehana* and *svedana* modalities have an important role in their own capacity as well as preparatory steps accompanying other therapies like *Rasāyana* therapy in the ayurvedic approach to deal with conditions of degeneration.

* Dr. N. Manojkumar helped me while preparing the manuscript

¹ Dey, N. C. and Dey, T. K., *A Textbook of Pathology*, 6th Edn. Calcutta, Allied Agencies, 1978, p.177.

1. Ayurvedic view of degenerative diseases

Dhātusaithilya is a condition described in classical texts.² It refers to a condition of slow disintegration of *dhātus* which are the basic structural units of the human body. This disintegration is mostly caused by its own malfunctioning. This process of structural disintegration is akin to a condition of degeneration. There are two major causative factors which result in this condition. They are the faulty metabolism of the structural units³ and the structural and functional faults of the body channels.⁴

2. Metabolism of structural units

Dhātus are the basic structural units responsible for the proper growth and development of human beings.⁵ They need to be properly nourished and metabolised for maintaining structural and functional integrity of the body. This metabolism occurs primarily because of *agni*.⁶ The term *agni* literally means fire and it refers to a kind of thermal energy produced and maintained by *pitta* which is one of the three basic somatic humors of the body and it is characterised as the vital heat. This heat of the body is responsible for all metabolic activities taking place in the body and if any fault occurs in the functioning of the heat, that naturally affects the

² Vāgbhaṭa, *Aṣṭāṅgasamgraha*, Ut, 49.7. Malayalam Commentary by Vaidyabhooshanam K. Raghavan Thirumulpad. Chalakkudy, Nirmala Printing Press, 1987.

³ Vāgbhaṭa, *Aṣṭāṅgasamgraha*, Śā, 3.62. *Bhagcerathi Tippani* by Sri Taradattpanth. Banaras, Chaukambha Sanskrit Series Office, 1956.

⁴ Agniveśa, *Carakasamhitā*, Vi, 5.24. English Commentary by Dr. Ramkaran Sharma and Vaidya Bhagvan Dash, Vol. II. Varanasi, Chaukambha Sanskrit Series Office, 1977.

⁵ Vāgbhaṭa, *Aṣṭāṅgasamgraha*, Sū, 20.12-16. Malayalam Commentary by Vaidyabhooshanam K. Raghavan Thirumulpad. Chalakkudy, Nirmala Printing Press, 1981.

⁶ Agniveśa, *Carakasamhitā*, Ci, 25.1. English Commentary by P.V. Sharma. 2nd Edn. Varanasi, Chaukambha Orientalia, 1992.

metabolism adversely. Ayurveda gives a very high importance to this fire and its right functioning in achieving proper metabolism and consequently in maintaining good health.

The ingested food gets converted to the structural units as a result of its metabolism by the digestive fire. This unit gets further metabolised to refinement due to continuous processing by the heat of the body. Ayurveda perceives human body as something which continuously and incessantly perishes. It is the structural units which are the microcosmal component units of the body, which actually perish one after the other. This depletion in the unit population is appropriately replenished by the fresh inputs arising from the metabolism of food by digestive fire. This is a natural flow. Creation of new structural units, their further metabolism into higher levels and their eventual extinction are a continuous sequence taking place in the body. The moment a fault occurs in the functioning of the heat then follows a natural fault in the normal sequential flow of metabolism and a degeneration of the structural units themselves which is manifested as a degenerative disease. Faulty functioning of the heat causes creation of various kinds of toxins which get deposited and collected in the cellular frame. Such collection of toxins also results in the occurrence of degenerative diseases.

3. The concept of body channels

Ayurveda talks about several types of channels which reach every point of the human body. Some of them are manifest ones which act as transporting media for body fluids and other tangible objects,⁷ whereas there are several others which are essentially conceptual in nature and are not quite manifest. They also act as channels for conveying organic constituents. This is the mechanism by which all the bodily elements are reached to different points of the body structure.

⁷ Agniveśa, *Carakasamhitā*, Vi, 5.3. English Commentary by Dr. Ramkaran Sharma and Vd. Bhagvan Dash. Varanasi, Chaukhambha Sanskrit Series Office, 1977.

Faulty functioning of these channels is a major cause for the degenerative ailments. A deficiency in the conveying capability of the channels can arise from various factors. There could be malformation and obstruction or occlusion preventing smooth flow through them. There could be a formation of nodules or other blocks.⁸ There could also be stenosis. Added to all these, the content which gets conveyed through the channels could itself be contaminated or vitiated. All these factors individually or together may affect the normal functioning of the channels. Such a malfunction naturally leads to depletion in the supply of nourishment to the structural units and consequently their metabolism gets affected and the internal homeostasis gets upset. The consequence of this development is the occurrence of a degenerative disease.

4. General features

When the *dhātus* which, as mentioned earlier, are the basic structural units of the body, retain their inherent state of health and perfection, the human body is stated to be healthy. If their structure and function get damaged as a result of faulty metabolism or faulty conveyance of nourishment or even as a result of genetic reasons, then the human body also becomes morbid.

Such morbidity caused by the disintegration or decay of the structural units will manifest as degenerative diseases. The decay of structural units will result in loss of bodily strength and its vital energy. The disintegration of the structural units usually ends up in three ways. (a) flaccidity of muscles which indicates structural deformity resulting in functional impairment;⁹ (b) looseness of joints;¹⁰ (c) depletion of vitality

⁸ Idem, Vi, 5.24.

⁹ Vāgbhaṭa, *Aṣṭāṅgasamgraha*, Ut, 49.7. Malayalam Commentary by Vaidyabhooshanam K. Raghavan Thirumulpad. Chalakkudy, Nirmala Printing Press, 1987.

¹⁰ Idem

which appears as general degeneration of the human body.¹¹ The decay of the vital energy will present itself as various complications. Some of them are the occurrence of vertigo, emaciation, lethargy or even acoustic hypersensitivity, atherosclerosis, osteoporosis, muscular atrophy, etc. They all come under the domain of *vāta* which is one of the three basic humors. *Vāta*, indeed, is the one humor which Ayurveda considers as the primary cause of major illnesses. Thus, the treatment modalities employed for dealing with conditions of degenerative diseases are those which are recommended for pacifying the vitiated *vāta*.

5. Treatment approaches

The treatments in ayurvedic system are basically of two kinds. They are *śodhana* and *śamana* modalities.¹² They literally mean methods of purification and pacification respectively. What they do is to remove the cause of morbidity from the body and to pacify the impact of morbidity. The purificatory therapy is usually preceded by the *snehana* and *svedana* modalities which are uniquely specialised in the Kerala tradition of ayurvedic practice. *Svedana* refers to a method of sudation or fomentation. *Snehana* refers to a method of oleation. What these preparatory steps attempt to achieve is to bring up the vitiated morbid materials to the *koṣṭha* which indicates the anatomical trunk of the body containing the internal organs. Once the morbid materials are brought out, then they are expelled by the purificatory therapy. This, in principle, is the ayurvedic approach of treatment. Vāgbhaṭa insists that in the absence of the preparatory steps, the purificatory therapy may not yield the required result.¹³ The anticipated result is described as strengthening of sensory organs and the mind which will be reflected in the improvement of general health. This also results in

¹¹ Vāgbhaṭa, *Aṣṭāṅgahṛdaya*, Sū, 11.39-40. *Bhagacerathi Tippani* by Sri Taradattpanth. Banaras, Chaukambha Sanskrit Series Office, 1956.

¹² Idem, Sū, 14.4.

¹³ *ibidem*, Sū, 13.28.

delaying the aging process and the process of degeneration will be slowed down.¹⁴

The *Rasāyana* therapy is also important in this regard which is essentially a rejuvenative or elixirisation procedure. These procedures act at the level of nutrition, metabolism and microcirculation. The *Rasāyana* therapy follows the purificatory therapy. Thus, both in the case of purificatory or the *Rasāyana* therapies, the preparatory steps of *snehana* and *svedana* have an important role. It is interesting to note here that in the case of palliative therapy also the *snehana* has a specific role to play as described by Suśruta, where the mode of action is rather different.¹⁵ In short, the sudation and oleation steps together with appropriate *śodhana* and *śamana* therapies accomplish the important objective of searching out the morbid factors from their residence spots and bringing up to the trunk of the bodily system. From where they are removed, the impact of morbidity is moderated and the general immune system is re-furbished.

6. *Snehana* and *Svedana*

6.1 *Snehana* (oleation)

Snehana helps to maintain proper functioning of the digestive fire, proper development of structural units, promotion of strength and resistance to disease. It also delays the ageing process and increases life span.¹⁶

Because of its unctuous property, oleation manages to enter the subtle parts of the body and to moisten the morbidity and its surroundings and facilitates its effective removal by the purificatory procedures. They permeate the fine pores of the channels of conveyance.

¹⁴ *ibidem*, Sū, 18.59.

¹⁵ Suśruta, *Suśrutasaṃhitā*, Ci, 31.3. Pandurang Jawaji, 2nd Edn. Bombay, Nirnayasagar Press, 1931.

¹⁶ Vāgbhaṭa, *Aṣṭāṅgahṛdaya*, Sū, 16.46. *Bhagcrathi Tippani* by Sri Taradattpanth, Banaras, Chaukambha Sanskrit Series Office, 1956.

6.2 *Svedana* (sudation)

The morbidity, which is moistened and loosened by the oleation procedure, is brought to the trunk of the body. Its unctuous and hot properties alleviate stiffness. It can enter into the cellular levels and relieves spasm. Oleation followed by fomentation subdues *vāta*, stimulates appetite and clears out the waste products. The oleation and fomentation steps possess opposite properties of *vāta*.

Svedana makes the body supple, removes stiffness of joints, cleanses the internal pathways and brings about better circulation. It also improves digestion.¹⁷ Modern studies have been carried out on the efficacy of *svedana karma*. *Svedana* has been reported to be effective in the treatment of osteoarticular group of *vāta* vitiation as well as neuro-muscular group of cases, and more in the former case.¹⁸ It also leads to normalization of erythrocyte sedimentation rate as well as the rate of connective tissue breakdown as reflected in lowered urinary excretion of hydroxiprolin and mucopolysaccharides. These observations suggest that this therapy not only produces symptomatic relief but also controls the disease process and may cause long lasting relief.¹⁹

With the help of pre and post therapy joint angiography, it has been demonstrated that *svedana* therapy produces varying degrees of recovery in vascular insufficiency of the joints to which several clinical and functional improvements can be attributed.²⁰

¹⁷ Vāgbhaṭa, *Aṣṭāṅgasamgraha*, Sū, 26.36-37. Malayalam Commentary by Vaidyabhooshanam K. Raghavan Thirumulpad. Chalakkudy, Nirmala Printing Press, 1981.

¹⁸ C.C.R.A.S., *Clinical and Experimental studies on Rasāyana drugs and Panchakarma Therapy*. New Delhi, Yugantar Prakashan, 1993.

¹⁹ Idem

²⁰ *ibidem*

7. Details of administration

7.1. Internal oleation

Oleation therapy is best administered internally. The lubricating nature of *snehana* helps to bring the vitiated *doṣas* to the *koṣṭha* for elimination. Cow's ghee is the best oleating medium. It is administered in what is known as the *snehapāna* therapy. It involves daily intake with incrementing quantity up to a peak quantity. Before the internal administration of the oleating agent, the condition of the patient should be assessed in relation to the tolerance. In any case, oleation will have to start from a comparatively smaller dose and then go up gradually. The increase of dose depends on the digestive condition of the patient. After attaining a maximum dosage in a week's time, appropriate purificatory step is to be performed after the sudation step.

7.2. External oleation

The external oleation varies from simple massage with medicated oils to other forms like *kāyaśēka*, etc. An added benefit of simple oil massage is that it is possible to be done as an OPD (Out Patient Departement) procedure. There is no harm in continuing with the oil massage as a regular practice. A feeling of lightness of the body will be achieved by the procedure.

Kāyaśēka

This is a process by which the body is made to perspire by means of the application of warm medicated oils in a specific manner. The patient is made to sit in a wooden basin and the specific medicated oils prescribed for the condition are first applied to the head as well as on the body. Massage is started in the sitting position of the patient. It is then continued when the patient is made to lie on his back. Subsequently he is made to lie on one side, then on the other side and then on his back and finally in the erect sitting position. Total time for the entire process will be around one hour. The course of the treatment will be decided according to the severity of disease condition. The medicated oil is to be poured at a medium speed

and from moderate height of about 5 cm. The procedure is continued till perspiration starts on the body especially on forehead, chest and armpit.

Both *snehana* and *svedana* can be administrated together. It helps to bring the vitiated morbid materials to *koṣṭha* and in the next stage, to push out them by appropriate purificatory methods. Apart from that the external body surface also gets nourished, the circulation will increase and it also helps to arrest the progress of the disease.

The important effects are:

- Maintenance of vital function
- Immediate symptomatic relief
- Arresting further progress of the disease
- Restoration of body strength
- Strengthening of target organs

Ṣaṣṭika piṇḍasveda

It is one of the most important forms of *svedana* in the Kerala tradition. It is a process by which the whole body or a specific part of the body is made to perspire by the application of certain medicinal boluses externally. The ingredients are *ṣaṣṭika* (a variety of *Oryza sativa* – 60 days matured paddy), *bala* (*Sida rhombifolia* ssp. *retusa*) and cow's milk.

Preparation:²¹ Specific quantity of *bala* root is washed and crushed into small pieces and put into water. It is boiled and concentrated. One half of the decoction is mixed with an equal quantity of cow's milk. The other half of the decoction is kept separately. To the first half *ṣaṣṭika* rice is added and cooked till it becomes a semi solid paste. The paste is divided into eight equal parts and taken in eight pieces of moderately thin cloth pieces of forty-five cm square. The edges are gathered and tied in the form of a bolus. The second portion of decoction is then mixed with an equal quantity of cow's milk and placed on a low fire. This is to be used for replenishing the warmth of the bolus. The treatment room should be well ventilated and well

²¹ Vayaskara N.S. Mooss, *Ayurvedic Treatments of Kerala*, 3rd Edn. Kottayam, Vaidyaratnam Press, 1983.

lighted. The doors and windows of the room may be partly or fully screened with light thin fabrics.

After applying oil to the head and body, the gentle massaging of the whole body with this bolus bags is performed by four trained attendants. Two attendants are posted on either side of the patient. One on each side massages the part between the neck and hips while the others on the lower limb. The uniformity of temperature and the pressure of the bolus bags should be maintained. The positioning of the attendants is to be altered every day in order to achieve uniformity of application. The duration of this course of treatment is dependent on the severity of the ailment.

Conclusion

An attempt has been made here to present the degenerative diseases and their treatments from an ayurvedic perspective. The structural units of the human body and their metabolic impairment are the primary cause of degeneration. The importance of *snehana* and *svedana* therapies, particularly the Kerala specialties, is highlighted with respect to their role along with the purificatory and rejuvenative therapeutic approaches, in the management of degenerative diseases.

REFLEXIONS OF A PSYCHIATRIST ON AYURVEDIC MEDICINE

Mário Simões
Faculty of Medicine
Lisbon

My comments are based on the lecture of *Carakasamhitā* (2nd edition revised. Transl. by C. Kaviratna and P. Sharma. Delhi, Satguru, 1996) and *Ayurveda – The Ancient Healing Art* by Scott Gerson. London, Element Books, 1993.

1. Curiosities

Since I studied anthropology, about twenty five years ago, and heard for the first time about Vedas I was very curious about a medical knowledge old more than five thousand years. Which diseases existed at that time? How did they cure them? What explanation was given for the causality? As a student, it was hard to find a suitable translation in English and I nearly forgot the Ayurveda, the "science of life" or "practices of longevity". Now it seems to me that I have been all the time, touching in some way some issues of ayurvedic medicine. Indeed, after reading about it and remembering my past interests since I graduated in medicine I notice that I always have been interested in phytotherapy, diets, physical exercises, meditation, yoga, astrology, massage, aromatherapy, gemotherapy, surgery and psychology. All these aspects are aspects of treatment used in Ayurveda! (I shall return to each issue)

Another observation was that the main divisions, especially, medical specialisation's of Ayurveda were in some way similar to those that we have nowadays – Internal Medicine, Paediatrics, Psychiatry, Diseases of Head (Ophthalmology, ORL, Stomatology), Surgery, Toxicology, Geriatriy (includes Rejuvenation) and Aphrodisiaca (Sexology and Infertility). I even underline that psychiatry existed at the time as an independent branch in medical sciences – what happened nearly only one

hundred years ago! More amazing is that the knowledge of "Aphrodisiaca" comprising sexology and infertility, were already addressed.

2. Insanity

It is curious to notice that reading *Carakasamhitā* chapters VII-VIII of *Nidānasthāna* and IX-X of *Cikitsāsthāna* dedicated to mental disorders as epilepsy or "insanity" – thought and memory disturbance –, there is a knowledge about inborn and acquired diseases and, for both, the statement about the multifactorial **causality**. The complexity of causes in psychiatry was already known, which is surprising, because they were in tune with the most advanced studies, away from certain actual reductionistic tendencies (biochemical or genetical). Ayurvedic doctors knew, for example, that causes could be remote in time from the effects that they produce or that a single cause may lead to several effects or even that a single effect may arise from several causes. These, including the well known causal trilogy – bio-psycho-social – included not only the known aetiologies, but also others not usual in the Western medicine, like affliction or curse of evil spirits and deities or incantations and will-force of superiors and seniors. I suppose that these are not considered psychological influences, as they are understood now, although psychological reactions are taken in account in Ayurveda. Naturally, one must take in account, also, the hinduistic concept of *Karma* and reincarnation, both allowing to understand predisposing factors and constitution. This constitution must be understood from the point of view of personality as well.

Precipitating factors are separated from accidental or organic and psychological ones, like extreme joy or abnormal strength, are mentioned as examples. Some other precipitating factors, facilitating onset of disease, not accounted by scholarly medicine, but making part of the traditional causal folklore as well in occident are worth mentioning. Among them are staying in a "deserted house" or "where four roads meet", in the "early morning" or at the "evening twilight", but also some dangerous days and hours were mentioned. These include the *Parra days* (8th, 11th and 15th day of the lunar fortnight) and the hours of "sacred" days when the sun passes

from one zodiacal sign to another. Some modern research concerning lunar activity and mental disorders or emergencies does not support this view. It should be interesting to know if hinduistic astrology has some correlations not found for Western. It seems, in this sense, that there is an intent to add another dimension – spirituality – in order to understand the human trajectory in Earth and, of course, the onset of disease at a certain time, for that particular individual. It is like asking to the patient – what must you learn from that disease?

Concerning **pathophysiology** of different disorders I was surprised by the explanation, nearly reduced to an unbalance of three *doṣas* ("humours" ?) – *vāta* (air/wind), *pitta* (fire/phlegm) and *kapha* (water/bile), appealing to the esoteric constituents of nature or resembling the Hippocratic writings on the four unbalanced humours (black and yellow bile, phlegm and blood). It is interesting that psychological dynamics or behavioural explanations never had highlights as they got in recent times in west. Most probably because there was a "feeling" that no new data were to be found concerning serious or severe mental illness, like it is the case at present.

Symptoms are the same as in Western medicine and even some psychiatric pictures could be recognised like mania, depression and "psychomotor agitation" and, to a certain point, some form of dementia. Of course, they are not the same as we know them now. There was also the idea that some diseases were only "suppressible", that is, they are not cured totally, they are sure to manifest themselves at intervals. This is the case in the modern nosology for recurrent depression or bipolar affective disorder and schizophrenia.

3. Attitudes and Treatments

The attitude towards the patient is quite similar to what it should be actually – a holistic approach, taking in account the whole person in its context, with an intention to bring the patient in balance or harmony with himself and the surroundings. I used the word *intention* with purpose, because I mean not only the intense concentration and wishful thinking of a

therapist in cure but also with the understanding that, in that intention, there is an "invocation" of the "active side of the infinite", as I understood it from my readings. I understood it as a "vibrating force" awaked by sounds (*mantras* – repetitive sung words), postures, respiration and movements executed by the patient and/or the therapist. It is quite similar to what Carlos Castañeda calls *Tensigrity* – intense purpose of cure in syntonization to the intention of Infinite. From my own experience I prefer to call it "healing field" created by both the patient and the healer where both listen to the voice of their inner "seer" while being temporarily companions in the Healing Road.

I could not help smiling when I came in contact with the **preparation of some medicines** some thousand years ago. Nowadays, in which all medical laboratories are concerned with sterilisation when managing medicines I was simultaneously horrified and delighted with the ingenuousness, because different parts or products of cows, goats or even jackals like hair, skin, nails, stools or bile were used. I imagined that the "factory" could evoke a "witch kitchen". With these and other components (plants and its parts) *ghcees*, unguents, snuffs, collyriums or drinks, were prepared and considered "capable of awakening the mind, the understanding, the memory and consciousness". As a curiosity, I cannot refrain from mentioning how such a preparation, considered a "good curative of Insanity" was prepared: 1. *Trikatu*, the three pungents a) dry ginger b) *Piper longum* and c) black pepper – two palas (?) of each should be taken 2. It should be added four times as much cow's urine 3. The former should be boiled with the later. It was not mentioned if was intended for drinking! Some more information about old *ghcees*, considered the most potent – "there is nothing which *ghce* that is a hundred years old cannot effect ... seen, touched or smelt dispels all calamities caused by evil spirits and malignant astral conjunctions".

Some other **"special" treatments** for patients "whose mind is wandering in multifarious directions" had the following rationale: the fear of life is greater than the fear of bodily injury, so, by putting the patient into fear of his life, mind becomes restored to a state of quietness. For that purpose, he should be "terrified by means of snakes deprived of their fangs,

or lions and elephants". Anyway, some other more merciful advisements were given to friends and family as "they should console him with words that are fraught with Piety and Profit".

The **prescriptions for Insanity caused by deities**, recognised by their peculiar clinical picture are also interesting. Since deities were not touched by material treatments, other means were used like worships of the deities, sacrifices and offerings to them, recitation of *mantras*, performances of religious rites and performance of *Homa* (sacrificial fire).

Individuals perform similar popular treatments, in the context of religious faith, at present, in Western societies, for example, in form of votive offerings.

Anyway, I underline that Ayurveda emphasises prevention of disease, rejuvenation, extension of life span and, through certain practices, tries to achieve our fullest potential. Of course, it is meant that there can be no mental health without physical health and vice versa, like in west, the known Latin aphorism *mens sana in corpore sanum* prescribes.

4. Epilepsy

I have still some thoughts on epilepsy (known thousand years ago!) that was considered a result of "excited bile, wind and phlegm, all three excited together". Because of this complex causality it was "exceedingly difficult to treat", a statement that, at present, is still true. Indeed a lot of epilepsies must be treated surgically and some remain untreatable. After the developments of brain imagery and laboratory tests, idiopathic epilepsies have reduced, but up to 70% have no determined cause! It seems that the whole body and mind is implicated in the disease and it evokes an old popular notion, discovered recently by science – it is like guts-brain, functioning automatically, it means, not influenced by will. Some symptoms of a grand mal attack (convulsive crisis) are a "discharge" (faeces, urine and saliva). If one takes in account that brain and other somatic structures are connected by common information (neuromodulators like CPK, VIP, Kolecistokinin, Angiotensin, etc.) it is easy to understand that any affliction (brain storm) shall have peripheral repercussions. I

came to these associations because the medicines prescribed at that time aimed to have effect on the digestive tract, according to the causation. In this way enemata were prescribed for "excited wind", emetics for "excited phlegm" and purgatives for "excited bile". Because of resistance to treatment everything was tried: some used fumigations with dung of cats, owls or snakes! In this difficult situation, advised physicians wrote that "patients always should be consoled with hopes of cure". Indeed doctors do not cure much, alleviate a lot but they shall give hope always!

5. Depression

There is some similarity between the three **different types of depression** listed in ayurvedic medicine (*vāta*-, *pitta*- and *kapha*-type) and the clinical types described in classic psychiatry, respectively, anxious, agitated and retarded. It is curious that for prescription we still use this classification, trying to build a link with new discoveries of neurotransmitters and clinical pictures, respectively serotonergic, this and noradrenergic and, at last, the noradrenergic type. The "old" knowledge teaches a predisposition of some constitutions (biotypology) to suffer from certain diseases. This is nowadays forgotten but it conveys the predisposition to depressions in accordance with the different human types classified according to the predominance of *doṣas*. I must say that in my psychiatric specialisation, under the influence of classic German psychiatry, I learned it and I still make use of that knowledge when prescribing. Let me say that I try to cure primarily the person with a disease and not the disease.

It became too difficult to integrate the old ayurvedic knowledge with the modern parameters and possibly because of that, the modern ayurvedic medicine modifies a few concepts. Yet I was surprised that in modern Ayurveda some **factors said to contribute to depression** were mentioned, for example, "too much sex or frequent masturbation", "exposure to wind autumn", "staying up late" or "excessive consumption of caffeine" (all contributing to *vāta*-depression); or "not wearing hat in the sun", "missing meals, especially lunch", "eating hot foods" (all contributing to *pitta*-depression); and "eating cold instead of warm foods", "reading or

watching TV while reading" and "daytime sleep" (all contributing to *kapha*-depression). As far as I know there is no rationale for these arguments and it seems that are simply common sense advises.

Naturally, **treatments** have common features and are based in diets (avoiding and eating specific foods) and practices that balance different *doṣas*, herbal remedies and "five senses remedies". Practices recommended are daily meditation, oil massage and listening to relaxing music. There is a "universal herbal formula for depression" to be drunk or inhaled and other specific treatments for each depression type. In the West there are some herbal medicines that are known for treating depression and anxiety and they have been object of research proving their benefits. Among these, I recall St John's Wort, for light and moderate depression, where hypericin should be the active component with some MAOI and trycyclic antidepressant features or ginseng used as energy booster. Other products used primarily for anxiety or as sleep inducer, used alone or together, are Valerian root and citron-tree extracts. Also Melatonin, as extracted from tomato (melatomatin), is used as agent of rejuvenation and sleep regulator. I mention these herbal remedies that I personally use, but I am aware that is not the case for my colleagues in Portugal, and even within Europe, they only have wide acceptance in Germany. The five senses remedies are common for all depressions and, according to senses involved, include bitter herbs and spices, warm aromas like camphor, use of colour red in dressing or surrounding, listening to sunset raga and, for touch, a self daily massage with a silk glove. One can describe all these activities as a kind of activation therapy.

As much as I know these treatments are not effective in heavy depressive states and I should only recommend them for light depressions.

6. Questions

Psychiatric disorders in ayurvedic texts are considered, mainly, as *vāta* unbalance and none has a "translation" in modern terms. Actually, they refer to symptoms with which there is some connotation with diseases, for example, *atipralāpa* (delusion), that in a certain way evokes **schizophrenia**.

This disease, still unveiled in its causality, only recently has some good prognosis, but unfortunately up to 20% of cases are therapy resistant and relapses are frequent even under therapy. It seems that causality is so complex, being a constellation of factors, that at the moment one should not exclude any cue that can open a path for an explanation and I mean here, for example, what *karma* and reincarnation have to say.

Another plague that Western psychiatrists face is **drug addiction**. Indeed, like for schizophrenia, there is multicausality and prognosis is very reserved. I mean not only the forbidden drugs but alcohol as well. Both patients wish to alter their consciousness because of various reasons. Is there a way to give them what they look for with other means that do not destroy their somatic and social life? Is there a special kind of preparation that fulfils both objectives? Or any other approach?

Panic disorder has turned into a modern disease. Formerly it was seen as an anxiety neurosis, where the crisis was the marker for that neurotic personality and disorder. Nowadays is discrete nosological entity. There are some psychodynamic theories trying to give an understanding for the onset, but the treatment is not curative, either using psychotherapy or psychopharmacotherapy. Relapses are frequent and even the crisis surges without *stimuli*. Can we ask to patients, as ayurvedic doctors do, what is the crisis trying to tell you?

I am sure that we have a lot to learn from oriental medicine, especially from Ayurveda, and I hope this seminar is the first step!

TRADITIONAL PROTOCOLS IN AYURVEDIC DIAGNOSIS AND TREATMENT

Vaidya Kedar R. Shende
Pune

1. Traditional methods in *nidāna* (diagnosis)

In Ayurveda, there are many traditional methods for diagnosis. They are called *parīkṣaṇa*. Different types like *aṣṭavidha parīkṣā* (eight fold examination), *daśavidha parīkṣā* (ten fold examination), *trividha parīkṣā* (trifold examination) are available. But they all boil down to *trividha parīkṣā* (examination) by *darśana* (observation), *sparsana* (palpation) and *praśnana* (querying or asking questions). For example, the *aṣṭavidha parīkṣā* is examination of *nāḍī* (pulse), *mala* (faeces/stools), *mūtra* (urine), *jihvā* (tongue), *dr̥k* (vision), *ākṛti* (general appearance), *svara* (voice), *tvac* (skin). These are to be examined but the point is that the *vaidya* shall use his sense organs to observe. All sense organs except the tongue, or sense of taste, can be applied by the *vaidya* to examine the patient. Of the remaining, *darśana* comes under the purview of sight, *sparsana* under the purview of touch, *praśnana*, i.e., questioning and getting answers, comes under the purview of speech as well as hearing senses. A lot of *vaidyas* lay specific importance to *nāḍīparīkṣā* and can diagnose a wide variety of diseases and symptoms from the *nāḍī*. This method is of course very subjective and involves rigorous and extensive experience. The generalisations of the *nāḍī* are formed in the intellect of the *vaidya* only after examining thousands of *nāḍī*.

2. Traditional *pāñcabhautika* method of *udara parīkṣaṇa* as part of *trividha parīkṣā*

Other than the standard methods of *parīkṣaṇa*, two things peculiar to *pāñcabhautika* methodology that are considered while examining a patient are date of birth and *udara* (abdominal) *parīkṣaṇa* (examination).

According to the theory laid down by Vaidyaraj Appāsastrī Datar, the proponent of the pañcabhautika school of thought, since conception of the foetus, the seven *dhātu* of the body take one month each (total 7 months) to be formed and to strengthen. Thus *rasa dhātu* is formed and strengthened in the first month, *rakta* in the second and so on. The 8th, 9th and 10th month (whenever applicable) are for the total growth and development of the organs and *dhātu*. Thus, if *rasa* and *rakta dhātu* are formed in *grīṣma ṛtu* (summer season), then there is *śoṣaṇa*, i.e., drying up of these *dhātu* due to the effect of the environment, thereby causing their improper formation. Since further *dhātu* are formed from these *dhātu*, they also will have poorer nutrition and hence shall be of poorer quality. Thus the date of birth of the patient gives us the approximate date of conception (9 months earlier assuming full term birth), consequently an idea of the quality of the *dhātu* in the subject. We can also judge what *doṣa* will be dominant in the subject. Thus a person born in June and hence conceived in say September of the previous year is more likely to have *pittaja* problems/diseases since September is the time of *pitta prakopa* in the macrocosm.

Udara parikṣana, abdominal examination:

Notes of percussion on the abdomen especially on *yakṛt* (liver), *plīha* (spleen) and *mūtrapinḍa* (kidneys) are taken. The notes are analysed according to the *mahābhūta* and the condition of these three important organs is defined. According to the pañcabhautika school, along with the standard and local examinations, the *yakṛt* (liver), *plīha* (spleen) and *mūtrapinḍa* (kidneys) are very important organs in respect of *nidāna* (diagnosis) as well as *cikitsā* (treatment) of most diseases because most of them have a definite impact on the structure as well as functionality of these 3 organs. During the *samprapti* (progression of disease formation), the disease affects some or all of them. These changes are understandable by studying the notes of percussion on the *yakṛt*, *plīha* and over the abdomen and by trying to palpate these organs.

In a healthy person, *yakṛt*, *plīha* and *mūtrapinḍa* should not be palpable at all on abdominal examination. If they are palpable, it reflects that the disease has affected the palpable organ and its *nidāna* and *cikitsā* should definitely involve treating them. The notes on the healthy *yakṛt*

should be *tejas*, or a mix of *tejas* and *āpya*. If there is a major deviation from these normal notes, such as *pārthiva*, *āpya*, *vāyavīya* or *ākāśīya*, then it suggests changes in the *yakṛt* that have to be considered with the other aspects covered by the standard parikṣaṇa for a proper *cikitsā*. Similarly, notes on a healthy *plīha* are expected to be *āpya*. Any major deviation in the notes suggests that the changes in *plīha* have to be definitely accounted for alongwith other standard examination for proper *nidāna* and then *cikitsā*.

3. Causes of disease

Ayurveda is a subjective *śāstra* (science) and like all Indian *śāstra*, very introspective. So, rather than searching for causality outside the body, it tends to search within. Of course it does not mean that *kṛmi* (worms/microbes), etc., are not considered at all. But generally diseases are considered to be due to:

Asātmya-indriya-artha-saṃyoga which are *ayoga*, *atiyoga*, *mithyāyoga*. *Asātmya* means which is not bearable to the body or which the body is not 'used to'. *Indriya* is the sense organ or connative organ. *Artha* is the subject of each sense/connative organ. *Saṃyoga* is exposure or interfacing or intercourse. *Asātmya* is further detailed as *atiyoga* (excessive exposure), *ayoga* (nil or very less exposure) and *mithyā yoga* (improper exposure). Let us consider an example of the *cakṣu* (eye) to understand this. If the eye is exposed to: (a) excessive light (*atiyoga*), or (b) has to perform the function of vision in dark or low light for very long periods (*ayoga*), or (c) exposed to improper lighting like flashing lights in discotheques (*mithyāyoga*) then it can result in disease. This applies to all other organs and the whole body as well.

Kāla (time). Time factor is also a cause for disease, e.g., old age related diseases.

Prajñā-aparādha. *Prajñā* (intellect) is divided into *dhī* (intellect proper), *dhṛtī* (power to use that intellect) and *smṛti* (memory). Offence of not using them properly can be a causality of disease. For example a person is not intelligent enough or does not have data enough to know that eating a lot of spicy / pungent food can cause burning defecation. Then there is a category

where such data/intelligence exists but the power to use that data does not, where temptation to eat spicy food is too great. A third category, where inspite of the memory from past experience, the subject eats spicy food again. Thus offence is committed from lack of either *dhī* / *dhṛtī* / *smṛti* or a combination of these resulting in disease.

Thus, we have seen all the causalities for disease formation.

4. Study of *dravya* or substances as medicine

Whenever a medicine for any particular disease is considered, the *rasa*, *vīrya*, *vipāka* and *prabhāva* are the factors which work in the form of the medicine. Of these, *prabhāva* is *acintya*, meaning, analysis or explanations are not possible. *Prabhāva* is a special quality of a particular *dravya* and no reasoning can be assigned to it. The remaining, viz. *rasa*, *vīrya*, *vipāka* can be analysed into their *pāñcabhautika* constitution, their dominant *mahābhūta* can be determined. After we arrive at a specific desired *pāñcabhautika* combination in the form of the *dravya*, further analysis leads us to which specific *guṇa* of that *mahābhūta* is dominant in that *dravya*.

Let us do a comparative study of two child patients ABC and XYZ in the age groups 3 to 6 years. Both were being treated for chronic *pittaja* complaints like *mukhapāka* (stomatitis), burning sensation during defecation and urination, etc. A peculiar complaint of XYZ, one of these children, or rather that of his parents was that since last few months, he had become short tempered, flew into fits of rage and was not willing to share anything with friends and siblings. This was analysed as a *tejas vikṛti* in the *mānasa bhāva*. As nutrition of *manas* is *pāñcabhautika*, so its constitution is also *pāñcabhautika*. Both the cases ABC and XYZ were treated among other medicines with *gairika* as the chief medicine. *Gairika* is *prṛthvī* dominant, *snigdha* (unctuous), *madhura* (sweet), *tuvara* (astringent), *caḡṣuṣya* (good for the eyes), reduces – *dāha* (burning), *pitta*, *hikkā* (hiccup), *viṣa* (poison). It is very much *pārthiva* in nature. In a few weeks time, the physical symptoms disappeared in both the patients, but the parents of XYZ kept complaining of his temper. After further analysis of

the case, he was treated with *vidruma* or *pravāḷa piṣṭi* (powder of coral). *Pravāḷa*, although has *pr̥thvī*, it is *āp* dominant. Also during its preparation it is triturated with *gulāba jala* (rose water) and in moonlight. This adds to the *āp guṇa*, as another name of moon is 'soma', i.e., water, hence *āp* dominant. The medicine *pravāḷa piṣṭi* had quite sensational results in 3-4 weeks. The *krodha* or anger reduced considerably, Also an important *guṇa* of *āp mahābhūta* is *sara*, i.e., to flow. The tendency of not sharing with friends and siblings, of with-holding or centralisation of what is usually called selfishness, was reduced by increasing the tendency to flow, causing de-centralising tendency.

5. The *rasa* connection

pañcabhutātmake dehe cikitsā pañcabhautikī.

The body is made up of *pañcamahābhūta*. Hence any *vikṛti* or condition of dis-ease is essentially due to an imbalance of these. The *cikitsā* therefore also has to be *pañcabhautika* for setting them in balance. Previously, we have seen that *dravya* work by way of *rasa*, *vīrya*, *vipāka*, *prabhāva* and *guṇa*.

*gurvādayo guṇaḥ dravyaiḥ pṛthivyātau rasāśraye,
raseṣu vyapadiśyante sāhacaryopacārataḥ* A.H. Su. 9

Rasa reside or are sheltered by *pañcamahābhūta* or *pañcabhautika dravya*. The *guru*, *laghu*, *ādi* (twenty *guṇa*) are also sheltered by the same *dravya*. Hence, *guṇa* are often associated with *rasa*. For example, milk is of *madhura rasa*. Milk is also *guru*, *snigdha*, etc. After such inter-relations were observed in many different *dravya* or substances, generalisations were made that *madhura rasa* is usually *guru*, *snigdha*, etc., while the fact remains that these *guṇa* and *rasa* are both independently a result of their *pañcabhautika* constitution.

The *pañcabhautika* traditional school lays strong emphasis on *rasa cikitsā* as it can be totally analysed into the language of the *mahābhūta*, so also the *vīrya* and *vipāka* can be defined in terms of *mahābhūta*.

The *rasa*, tastes, are six in number. Their *pāñcabhautika* composition is as described.

Rasa dominance

Madhura, sweet taste
āmla, sour taste
lavaṇa, salty taste
katū, hot or pungent taste
tikta, bitter taste
kaṣāya, astringent taste

Mahābhūta

pr̥thvī + *āp*
pr̥thvī + *tejas*
tejas + *āp*
tejas + *vāyu*
vāyu + *ākāśa*
vāyu + *pr̥thvī*

Madhura rasa:

When describing *madhura rasa*, *Vāgbhaṭa* in A.H.Su.10 has given as its quality that is liked by ants that are attracted to it. If one observes the ants, one cannot help but notice their small size and a comparative excessively mobile life style. Ants are extremely mobile. This causes an increase of *vāta* in their bodies, as mobility is the quality of *vāyu mahābhūta*. Instinctively, they are drawn to *madhura rasa*, which is *pr̥thvī* and *āp* dominant and helps to restore the balance of *mahābhūta* in their bodies. The ants have thus unknowingly applied the *sāmānya viśeṣa siddhānta*.

pr̥thivyambu guṇa bhūyiṣṭham, br̥ṇhaṇam

Madhura rasa is thus *pr̥thvī* and *āp* dominant and its main function is *br̥ṇhaṇa*. *Br̥ṇhaṇa* is to cause *śarīra vardhana*, i.e., to increase or build up body components. Being the building block, it is very useful for children where growth is essentially an undetachable property of childhood. Old age being *vāta* dominant age, there is an increase in the *vāta guṇa* in the body and the wear and tear of the body is quite fast. To reduce or slow down this ageing process, *madhura rasa* is used. Middle age is *pitta* dominant or *agni* dominant age. Even in nature, fire is pacified by *pr̥thvī* and *āp*. So also in the body, *madhura rasa* is useful in pacifying *pitta*. Thus *madhura rasa* is beneficial in all ages. Due to *pr̥thvī*, *madhura rasa* gives stability, heaviness. At the same time, the *āp* content does not allow *rūkṣa guṇa* or dryness to increase. The only point to be noted is that *madhura rasa* being heavy to digest, can be useful only in right amounts of dosages.

Āmla rasa:

Āmla rasa is made up of *agni* and *pr̥thvī*. *Agni* or fire is *ūṣṇa* (hot) and *tīkṣṇa* (piercing) in qualities. When such a *dravya* comes in contact with the mouth and membranes, *tejas* causes burning. To neutralise this, instinctively, when we eat anything sour, our mouth starts watering. There is excessive salivation and *āp mahābhūta* is increased to balance the *tejas guṇa*. Excessive sweating as in physical labour or exposure to sunlight for long periods causes *vāta* aggravation. At such a time, *āp mahābhūta* in the form of lemonade or butter milk which is *āmla* or mildly sour gives better relief physically as well as mentally than plain water. Similarly when we have reduced *agni*, aggravated *vāta* in the region of the digestive apparatus, *vāyu* becomes *vimarga*, i.e., leaves its prescribed place and route. This causes flatulence, abdominal distension, and dryness of faeces, constipation. At such a time, *āmla rasa dravya* are the best to increase the *agni*, alleviate and make *vāta anuloma*, to redirect it properly. Also we have seen how *āmla rasa* causes *viṣyandana*, i.e., secretion of *āp mahābhūta* from the mouth. Similarly from the membranes of the intestines, bringing unctuousness to the intestines, reducing dryness and thus relieving all the above symptoms.

Lavaṇa rasa:

This *rasa* is *tejas* and *āp* dominant. Due to *āp* content, there is *abhiṣyanda* or secretion leading to increase in water content and thus wetting action. Similarly *tejas*, by its piercing and *sūkṣma* qualities, removes the obstructions and hence the rigidity of the *srotas* walls, channels, thereby bringing elasticity and *mṛduta*, i.e., softness. Thus removal of obstruction, increasing secretions and hence unctuousness help in various conditions like *kāśa*, i.e., cough, with very *styāna* or sticky mucus or *śvāsa*, i.e., breathlessness due to obstruction.

Tikta rasa:

Tikta or bitter taste causes *viṣada* or cleaning up of the mouth without leaving any adherence or anything sticking inside. It is *ākāśa* and *vāyu* dominant. Any stickiness in the oral cavity or elsewhere is removed by this *rasa*. It is thus exactly opposite of *madhura rasa*. This causes aggravation of *vāta* and reduction in *kapha*. Immediately on touching the tongue or

membranes in the oral cavity one can feel the drying up and cleansing action of this *rasa*. Being *rūkṣa* (dry), *sūkṣma* (capable of entering even minute sites), it causes *śoṣaṇa*, i.e., drying up and removal of *kapha* like secretions. Thus can be used in cases of *kapha* aggravation, excessive secretion etc. Also being *vāyu* dominant, it helps to build the *agni*. Thus in conditions of low *agni*, this *rasa* in the right doses can be effectively used to build up the *agni*.

Katu rasa:

This *rasa* is *agni* and *vāyu* dominant. There is this *agni* with its *ūṣṇa* (hot) and *tikṣṇa* (piercing) qualities and *vāyu* by blowing into this fire and increasing it, adds to the fire. *Katu rasa* is thus very much opposite of *madhura rasa* and *kapha doṣa*. It breaks up the building blocks can consumes them. If it has to be used in medicine, this has to be one with utmost care regarding choice of *dravya* and its dosage. *Agni* and *vāyu* both cause *śoṣaṇa* or drying up of the *dhātu*. But it can be effectively used in conditions of low *agni* due to aggravated *kapha* and also in *āma pācana*, i.e., digestion of *āma*.

Kaṣāya rasa:

This *rasa* is *pṛthvī* and *vāyu* dominant. They are exactly opposing in qualities and their union causes some very extraordinary actions. *Vāyu* being dry causes drying up of *srotas* walls. *Pṛthvī* being *guru* and *ghana* fills up the *srotas* thus causing *stambhana* or blocking. Astringent quality of the *rasa* is thus clear. Thus there is *srotorodha*, i.e., blocking of *srotas* along with drying up of the *srotas* membranes. This quality is effectively used to stop bleeding in cases of haemoptysis, haemorrhoids, discharging wounds, etc. Also to stop excessive secretions as in excessive salivation, hyperactivity of certain glands, etc. Thus studying the various *dravyas* as regarding their *rasas* and also their specific action helps to decide the line of treatment.

6. Necessity to study Ayurveda as a whole

Today, we are in a situation where health concerns are on the rise and there is an increasing tendency amongst the people all over the world to

go in for natural and alternative systems of medicines. Add to this the fact of globalisation and we have a very explosive combination of medicine, medical education, pharmacy, finance and finally politics. There are many legalities and laws concerning medical practice and these differ from country to country. This poses a problem especially for Ayurveda proliferation outside India since Ayurveda has a very rich *materia medica* which contains metals and minerals also. Metals, especially heavy metals are considered as poisonous in many countries especially the west. What is lost in the process is the fact that ayurvedic pharmacy also recognises the toxicity of these metals and so these metals undergo various processes, they are converted into non-toxic preparations and are made effective and safe for internal use. We have been using these in India for thousands of years. Not only metals, medicines even from plant origin are banned. For example *sarpagandha* (*Rauvolfia serpentina*) is banned in a lot of countries including Israel, USA, etc. The reason cited by the health control agencies is that it contains a chemical, 'reserpin' which is a very strong cardio suppressant. This is exactly where the problem lies. *Sarpagandha* as a whole, as is used in ayurvedic medicines, is not noted to have such an effect. It is used effectively in Ayurveda as a cardio suppressant especially in *vātaja* cardiac disease. When modern pharmacists tried to isolate the molecule that was responsible for the cardio suppressive action, they found reserpin. When reserpin was used isolated, prolonged intake resulted in excessive suppressive activity and also 'suicidal tendencies' in many subjects. What was lost in the process was that there must exist a certain other molecule in the plant as a whole which counteracts this activity, because such tendencies are not noted in subjects where the whole plant is used. Thus the tendency to isolate some factor from the whole plant for a specific action rather than using the plant as a whole, has concluded (or rather misconcluded) that *sarpagandha* can be harmful to health and so it is banned.

From this and many other examples it is noted that the parameters for deciding the efficacy of medicines are being wrongly chosen. One cannot say that he would like to see the mountain on the horizon using reading glasses. Statistics from the National Institute of Health, India, as

one of our speakers the previous day has cited, are that 117000 compounds, regularly used in Ayurveda, have proved useless as leads for treatments from a modern pharmacological angle. Ironically, these medicines have been used effectively for hundreds of years. If an Indian were to study the launching of a rocket, he has to study everything right from the Newton's third law etc., from the perspective of modern science. Similarly if Ayurveda needs to be studied for its use world wide, it has to be studied from the perspective of Indian *śāstra*. Given an absolutely transparent glass bottle, it is impossible to tell if it contains water without touching /shaking it. If a drop of ink is added then one can certainly say that there is water in the bottle. The only problem then is that the thing in the bottle is no more water but an ink solution. I hope that this does not happen to Ayurveda. The necessity that the Indian scientist feels to explain Ayurveda in a way that the Western scientist would find easy to understand, but which is in fact, not a perfect expression of our science, is astonishing. It is ironical that during the days of the 'sahib' (as the British / Portuguese rulers were called), we were possessively protecting our cultural and traditional arts and sciences from the west. Perhaps other than nationalism, an important reason was that the west bought it without paying for it. Now in a free world, we see this opportunity to earn and then we bend over backwards trying to sell our ideas and information, without caring if we are compromising on the basic principles, without caring whether the originality or the substance of the matter is lost, without caring if there is any diluting in the philosophy of our science when we try to translate it in some other parameters. I can see that this sounds very hard hitting, but I think this point needs to be made, as this is the right time when scientists can sit and decide what parameters should be considered for evaluation of efficacy of medicines. If the source of medicines is going to be limited, then there needs to be research on finding the *rasa-vīrya-vipāka* of the European plants and then apply them with the philosophy of Ayurveda.

Finally,

sarve sukhinah saṁtu, sarve saṁtu nirāmayāḥ ...

let everyone in this universe be happy and healthy.

VALIDATION OF AYURVEDA: LIMITATION OF THE CURRENT CROSS-CULTURAL MEDICAL APPROACHES

Unnikrishnan Payyappallimana

Foundation for the Revitalization of Local Health Traditions
Bangalore

Before going into the presentation let me explain two key words in the title of my paper. 1. Validation of Ayurveda 2. Cross-cultural approaches. Here the word validation of Ayurveda is used to denote the research done to establish "scientific" basis for ayurvedic methods either at diagnosis or at treatment level or research done for standardisation of ayurvedic methods. By using the word "cross cultural approaches" here I mean the study of one system of knowledge that has derived in a particular cultural context with the understanding of a system belonging to another cultural context. I want to point out that Ayurveda has developed in a culture and worldview that is different from that of Western science. Thus, these are two completely different systems with different epistemologies. From this broad frame of reference I would like to have a critical look at the current approaches in this research.

Contemporary research on Ayurveda is primarily to validate Ayurveda through the approaches of Western science. As mentioned earlier here the attempt is to find out whether Ayurveda has a scientific basis and whether ayurvedic methods can be standardised to suit the contemporary demands. This effort can be called a "bridging research". By using this term it has to be understood that the discussions in this presentation are related to various issues in comparing and relating two knowledge systems.

Present day research in Ayurveda cover a wide range of approaches. Let us look at some of the current topics or themes of research. These topics are taken from the research publications in the field of Ayurveda.

No	Research title	Research focus
1.	Anti-diabetic effects of S-allyl cysteine Sulphoxide isolated from garlic (<i>Allium sativum</i>)	Research on a plant active ingredient for a bio-medical nosological entity
2.	Effect of piperine on bio-availability of Oxyphenylbutazone in rats	A plant active ingredient for a bio-medical pharmacological activity
3.	Neuropharmacological activity of <i>Solanum nigrum</i> fruit extract	A total plant extract for a bio-medical pharmacological activity
4.	Preventive effect of <i>cyavanprāsa</i> against steroid induced cataract in the developing chick embryo	An ayurvedic formulation for a bio-medical nosological entity in an animal model
5.	A study of <i>bhūmyāmalakī</i> in <i>Kāmalā</i>	An ayurvedic plant for an ayurvedic nosological entity
6.	Immuno modulatory activity of Septillin, a poly herbal preparation	A non-classical proprietary formulation (which is newly developed) for a bio-medical pharmacological activity
7.	Effect of <i>vasti</i> therapy in the management of irritable bowel syndrome (<i>pakvāśaya gata vātavyādhī</i>)	An ayurvedic treatment method for a bio-medical nosological entity correlated to an ayurvedic entity
8.	Clinical study of <i>kirātatikṭādi yoga</i> on <i>kiṭibha</i> (psoriasis)	An ayurvedic formulation for ayurvedic nosological entity correlated to bio-medical entity
9.	<i>Vātari guggulu</i> and <i>mahārāsnādi kvātha</i> in the management of <i>āmavāta</i>	An ayurvedic management for ayurvedic nosological entity without any correlation

The above research titles can be broadly classified into the following categories:

- * Looking for active ingredients, bio-molecules or novel structures from medicinal plants for specific activities, diseases
- * Experimental/clinical studies of medicinal plants for Western biomedical or ayurvedic nosological entities
- * Studies on ayurvedic classical formulations for bio-medical or ayurvedic nosological entities
- * Studies on proprietary preparations (of pharmaceutical industry) for a particular condition/activity explained in either bio-medicine or Ayurveda
- * Ayurvedic formulations or treatment procedures/management methods for ayurvedic or bio-medical nosological entities

It can be noted that these approaches are quite diverse and complex. There are number of shortcomings in these current research designs. One of the major problems in the current research works on Ayurveda is that there is no standardised method that is followed across different types of research, or different institutions, which do these researches. Yet another problem is that except in rare cases, most of the research protocols used in these studies are designed with the principles, categories and approaches from the Western bio-medicine which are quite different from those of Ayurveda. Thus the attempt is to validate a system not from within but from outside. These are done with superficial understanding of ayurvedic principles and insufficient correlation studies between the two systems. Because of this in many areas these research designs are not compatible.

Let us look at one factor such as end points in a research. For example in a malaria research using ayurvedic medicines at times only blood smear test is considered as the end point. Ayurvedic drugs may not necessarily cause parasitocidal activity but may work on immunological parameters and the patient may be healthy even with the presence of parasite inside the body. But taking an end point, which is recognised by the biomedicine as the major parameter, the research may fail to understand the drug action in ayurvedic way. Especially when the mechanism of drug action of a treatment is not understood, it is better to also use end points that are internal to the system along with others.

Poor correlation of diseases across different systems is yet another problem. For example *pāṇḍu* in Ayurveda is correlated to anaemia and *pramcha* to diabetes. Ayurvedic nosological entities are broad and it may not exactly correlate with the modern understanding of the disease. In the above table *kṛtibha* is correlated to psoriasis and irritable bowel syndrome is correlated to *pakvāśayagata vātavayādhi*. These correlations are not done with sufficient studies in the field. Thus, before embarking onto a research, a common understanding is not arrived at.

Similarly as the textual descriptions may belong to a particular chronological period, it may not match with the disease presentation today.

The malaria existing today need not necessarily be *viṣama jvara* explained 3000 years ago. So for managing the contemporary problem of malaria if we correlate malaria with *viṣama jvara* it may not be right and may not give desired results. The presentation can be completely different now because of the various environmental or biological factors.

When one screens through the ayurvedic classical literature it can be understood that post 17th century there has been comparatively less documentation of the new diseases or studies on how to diagnose them. Most of the works during this period have been to compare ayurvedic disease entities with bio-medical disease nomenclature or modern medical description of a condition in the form of Sanskrit translations. Chapters like *mastiṣka cayāpacaya nidāna*, *mastiṣka vepathu nidāna* in *Bhaiṣajya ratnāvalī* are apt examples of this. The basis of these correlations is not sound. Lack of fresh documentation of a disease conditions based on ayurvedic principles and lack of foundational studies in correlation are major issues in such research programs.

A related issue is the lack of understanding of a nosological entity within the ayurvedic community. Conditions such as *raktapitta*, *pāṇḍu*, *prameha*, *visarpa*, *vātarakta*, *ālavāta*, etc., are not properly understood within the system. It is also noted that there is no common understanding of these disease entities across different institutions in the country. This is not a weak point of ayurvedic description of a condition in the classical literature but an attribute of present poor ayurvedic education system, which is emerging having no clear vision in the area of Ayurveda.

By using a mixture of ayurvedic and modern methods without sufficient insights into how to bridge between the two systems, ayurvedic education, research and practice have fallen into a state of "bricolage" (Obeyesekere 1992). This has led to poor quality of research protocols, research journals as well as publications in the field of Ayurveda.

Yet another issue is socio-political-economic in nature. The cross-cultural validation or dialogues are not happening in a respectful way that can be attributed to the current social status of Ayurveda compared to biomedicine. This makes the approach hierarchical.

When we look at plant based studies most of the studies on ayurvedic *materia medica* happens to be a "drug hunt". This means that ayurvedic *materia medica* is looked at as a mere treasure house for seeking herbal solutions for present day problems. This treasure hunt is carried out without having sufficient studies on the wider epistemological base of these formulations in Ayurveda. In Ayurveda it is not the drug that matters but a detailed method of management of a condition through drugs, diet and lifestyle changes. Where as present method seeks only remedies/drugs and not the management methods. Thus it does not recognise the stage wise management ideas, dosages or other details mentioned in Ayurveda. For example treatment of *jvara* starts by a method of *lañghana* (depleting therapy), goes on to *śaḍaṅga pāna*, then to decoctions, to *kṣīrapāka*, *ghṛta*, *lcha*, etc. This is the stage wise management described in the classical ayurvedic literature. But when the research is done only on effect of *śaḍaṅga pāniya* for *jvara*, it does not consider the stage, types or form of medicine explained in Ayurveda.

Nomenclature correlation explained earlier, is not only an issue at the level of disease correlation but also for correlation of plant and other natural resources' nomenclature. There are many medicinal plants in Ayurveda correlated to multiple botanical species. This is due to the polynomial system of nomenclature that is followed in our traditions. But as this system of polynomials is not well understood by the present day researchers it has led to many misinterpretation and controversial identities of plants. There could be number of reasons for this and it is not the objective of the article to go into those details of these controversies. But it is to be noted that except for the stray attempts there has been no work done in the area of correlation studies in plant nomenclature between Ayurveda and Botany. Thus drugs are selected without critical studies.

There are number of quality standard measures that are recognised by ayurvedic classical texts. But the present modern methods of quality standards for medicinal plants do not recognise these at all. For example, there are specific places for collection of plants, specific seasons, methods of collecting plants for a plant to have the best quality. There are also certain quality parameters while processing and storing drugs mentioned

which are not considered in the research programs. It is encouraging to note that there are experiments in some of our research institutes to integrate ayurvedic parameters into the development of research tools. One of the good examples for this is the *tridoṣa* interpretation method with the help of high power liquid chromatography (HPLC) developed by Indian Institute of Chemical Technology, Hyderabad.

Designing of *yoga* (formulation) is an important factor in Ayurveda. *Yoga* in Ayurveda is an intelligently designed drug targeted towards a specific condition or stage of disease/health. When a new drug is developed by a pharmaceutical industry or any research centre it hardly takes into consideration the concept of *yoga*. Designing of *yoga* is a poorly understood and discussed factor in present day ayurvedic system. It is important to do foundational works on design of *gaṇa*, *yoga*, etc., that are described in Ayurveda.

By ignoring these concepts most of the time the research ends up having partial idea about a formulation. It is stated clearly in *Carakasamhitā* that by studying a part the whole cannot be understood. Apart from this there are number of factors that are considered to understand the drug action in the body. For example according to *Carakasamhitā* a drug acts through the following factors – *dravya* (drug substance), *guṇa* (quality), *adhikaraṇa* (substratum), *kāla* (time), *yukti* (application), *artha* (means), *abhipreta* (intent), *karman* (action), *upāya* (stratagem), *phala* (effect). But as these factors are seldom considered in the research the mode of drug action is not studied rigorously and most of the present day proprietary formulations have no ayurvedic basis.

Modern studies of active ingredient search have similar handicaps. For example we are familiar with the CSIR (Council for Scientific and Industrial Research, India) work on piperine and bio-availability. Now it is understood that when piperine is used along with Western pharmaceuticals like anti-tuberculosis, leprosy drugs, the dosage and frequency of those drugs can be considerably reduced. By using this, the duration of intake of drugs and their adverse effects can be reduced. But from an ayurvedic point of view there are number of things to be considered while using *pippali*. There are around 330 references to the plant *pippali* in a single text, i.e.,

Carakasamhitā that gives lots of insights into usage of *pippalī*. It is well understood that many of these references pertain to usage of *pippalī* as a vehicle or carrier of other drugs. This has given lead for CSIR to do research on bio-availability enhancing activity of piperine. But one of the references says that *pippalī* has to be used carefully.

*Atha khalu trīṇi dravyāṇi nātyupayauñjītādhikam
anyebhyo dravyebhyaḥ tadyathā – pippalī, kṣārah, lavaṇam iti
Carakasamhitā, Vimānasthāna, 1.15*

Which means *pippalī*, *alkali* and salts should not be used for longer time compared to other materials. Present CSIR study has not looked into what contra-indications and special precautions that Ayurveda mentions while using *pippalī*. With ayurvedic understanding it can be interpreted that piperine on long term may cause bleeding disorders. It can also cause *tridoṣa* vitiation and leading to number of conditions. It may be possible that after 5-8 years of promotion of clinical usage of piperine, these adverse effects will be confronted and recognised. The contention here is that when the leads are taken from Ayurveda and its wider implications are not understood properly, it is likely to give negative results on long-term usage. This at a later period will be considered as the weakness of Ayurveda and it will fire back to the system (Unnikrishnan 1997). So it is mandatory to do detailed studies of ayurvedic prescriptions before attempting such plant studies.

Yet another related issue is of acknowledgement and benefit sharing. There has to be proper acknowledgement of the fact that the lead for such an experiment has come from Ayurveda. Apart from that how will the benefit gained out of the piperine patent contribute to the further research and development in Ayurveda. At present there is no institutional mechanism in the country through which the benefit for this can be shared with ayurvedic community as per the convention on biological diversity (CBD).

Another issue is related to what is called medical absorption. When, in a pluralistic health care system, there is a hierarchical relationship

between medical systems, it is likely that the results of these kinds of researches, naturally gets absorbed into the economically and politically stronger medical system (Lee 1982). Quinine is an allopathic drug today. The usage of the plant from which quinine is derived for malaria is the intellectual property of a South American tribe. Similarly reserpine is another example. There are number of instances like this where such medical absorption is happening.

How does this kind of research strengthen the ayurvedic pharmacopoeia? This does not support understanding of ayurvedic diagnostics, or treatment. Through these researches new diseases or new plants are not getting understood on ayurvedic principles. In general even though these research efforts are intended for development of Ayurveda, they are not doing so and on the contrary they are becoming detrimental to Ayurveda's progress.

What needs to be done

The present context of research in Ayurveda thus demands foundational research in the subject on concepts of Ayurveda. For example rigorous studies on concepts that are central to Ayurveda like *kleda*, *āma*, *vidāha*, *agni*, *vāta*, *sāra*, *ojas*, *sattva*, *utkleśa*, etc., are essential to have rigorous research designs. Thus correlation studies should not be at superficial level but at the level of concepts and theoretical principles. Based on these, careful correlation studies have to be initiated between disease entities. It has to be kept in mind that it is not only essential to correlate the disease names or their symptoms but also the pathogenesis so that the point of convergence or differences of opinions between different systems can be well understood.

As mentioned earlier Ayurveda understands disease as a process, correlation of this process is important, e.g., malaria correlation to *viśama jvara*. Such a study will have to correlate *pañca lakṣaṇa nidāna* (fivefold diagnosis) – *nidāna* (aetiology), *pūrvarūpa* (prodroma), *rūpa* (symptoms), *upaśaya* (therapeutic diagnosis), *saṃprāpti* (complete manifestation). Treatment could be *nidāna parivarjana* (removal of the cause), *prakṛti*

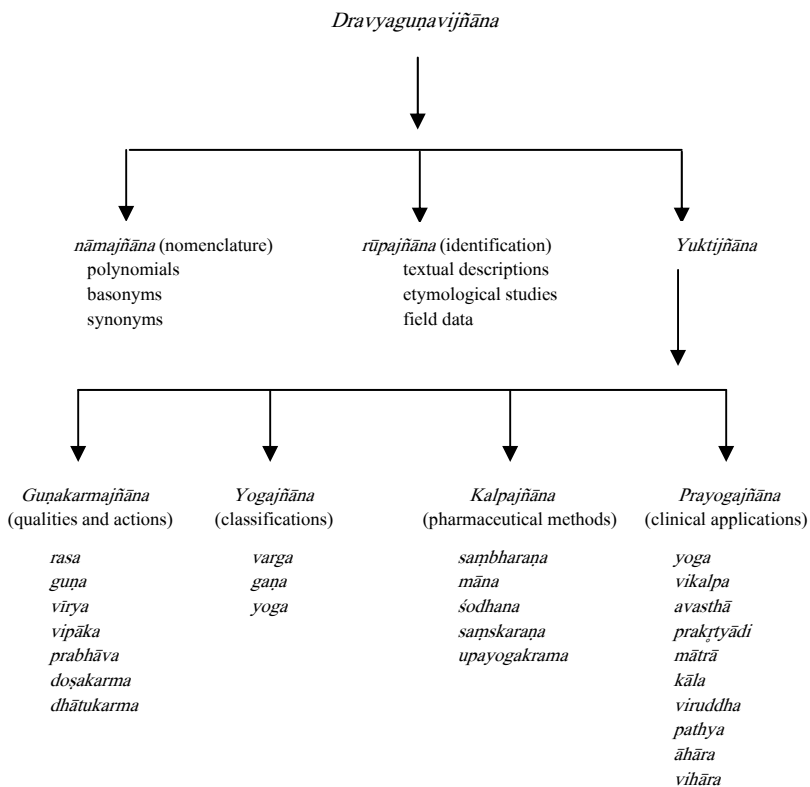
vighāta (changing the internal environment). Once disease and its management is well understood it will help in designing proper research protocols and mutually agreeable end points.

For this purpose exhaustive literature studies have to be initiated. Apart from this, consulting living traditions, i.e., the eminent *vaidyas* in the field and their understanding of that particular condition and its management, would also be beneficial. In the process of institutionalisation and professionalisation of Ayurveda the rich oral, living experiences of old *vaidyas* have been neglected. These experiences have to be incorporated into designing of research strategies.

Need for critical clinical documentation is another area. Understanding and documenting diseases in the ayurvedic way will help to build ayurvedic nosology. As mentioned earlier post 17th century works in the area of *nidāna* or *cikitsā* have been rudimentary or a mixed approach with that of Western bio-medicine. Fresh documentation of diseases on ayurvedic lines is essential to fill this chronological gap and understand newly emerging conditions. There is a need for textual studies with respect to descriptions of diseases and their management across chronological periods. Building up databases and expert systems will serve a great deal in minimising the effort in this research. One such example is the work on *Lakṣya lakṣaṇa kośa* done by *Vaidya* Gadgil and his team in Pune.

In the area of plant studies, foundational studies on the concept of *yoga*, drug design, mode of action, etc., are essential. Developing databases on ayurvedic parameters of quality standards, designing evaluation methods based on ayurvedic parameters and proper cross-cultural dialogues in selecting drugs for research are also essential.

The following is a model database structure on ayurvedic *materia medica* that is developed in our institute.



This has taken into consideration various features that are explained in ayurvedic *materia medica* such as nomenclature of plants, identification methods, etymological descriptions, qualities and actions, classifications like *gaṇa*, *varga*, collection specifications, pharmaceutical processing, measurements and storage, clinical application with details on type, stage, dosage, time, method of administration, contraindications, *pathya* (dietary and life style instructions), etc. Such database designs will have to be developed in different speciality areas of Ayurveda.

Conclusion

Diversity of world-views is essential for cross cultural exchange and growth of concepts, methods. These researches should be designed so as to respect and nurture diverse worldviews. It is clearly understood that the theoretical framework and the worldview of Ayurveda are quite different from that of modern medicine. The collaborative research has to be sensitive to the issues relating to the difference in the epistemological framework of two different systems. What is required is strengthening the knowledge base of Ayurveda. It will be necessary to develop authentic databases and expert systems for promoting research. Developing standardised research codes across the country and different research designs that may be called "good ayurvedic clinical research practice" is an urgent need. Centres of excellence for foundational research as well as collaborating centres for bridging research have to be started with immediate effect. Finally a clear vision of how to bridge between medical systems will have to be emerged from a serious and critical introspection of last few centuries of developments in Ayurveda.

Bibliography

Lee, R.P.L. (1982) "Comparative Studies of Healthcare Systems in Three Chinese Societies" in *The Art of Medical Anthropology* (1998) Eds. Van der Geest, S. and Rienks, A., Amsterdam, Het Spinhuis.

Obeyesekere, G. (1992) "Science, Experimentation, and Clinical Practice in Ayurveda" in *Paths to Asian Medical Knowledge* (1992). Ed. by Leslie, C., and Young, A., Berkeley, University of California Press.

Sharma, P.V (ed), (1983), *Caraka Saṃhitā*, Varanasi, Choukhambha Orientalia.

Unnikrishnan, P.M (1997) “The Agony of the Golden Goose” in *Amruth*, Feb, 1997. Bangalore, Foundation for Revitalization of Local Health Traditions.

CLASSICAL AYURVEDA AND ITS MODERN PRACTICE: STUDY AND FIELDWORK OF AYURVEDA IN INDIA AND IN AMERICA

Kenneth G Zysk
Copenhagen University
Copenhagen

For many years, I focused my attention on the early history of Indian medicine, which can be broadly divided into three main phases. The first or Vedic phase dates from about 1200-800 BC and is dominated by magical medicine. The second or "classical" phase is marked by the advent of the first Sanskrit medical treatises, the *Caraka* and *Suśruta Saṃhitās*, which systematize a vast amount of medical information around a theory of three *doṣas*. This period dates from a few centuries before to several centuries after the Common Era, and includes all subsequent medical treatises dating from before the Muslim invasions of India at the beginning of the 11th century – for these works tend to follow closely the earlier classical compilations. The third or "syncretic" phase is indicated by clear influences on the classical paradigm from Islamic or Unani and other non-classical medical traditions, as witnessed in Śārṅgadhara's *Śārṅgadhara Saṃhitā*, dating from the 14th century, and Bhāvamiśra's 16th century work, *Bhāvaprakāśa*. The time span for this phase extends from the Muslim incursions to the present era.

We have now entered fourth phase of Indian medical history, which I call "New Age Ayurveda". It connotes, for the most part, classical Indian medicine imported to the Western world by both Indians and non-Indians. Today, Ayurveda has found fertile ground, among others, in Europe, Australia, and North America.

As my interests began to turn more to the Ayurveda in the modern world, I began to notice that a proper understanding of Ayurveda could not be obtained without a good practical understanding of the medical system.

I, therefore, decided to begin to acquire a working knowledge of Ayurveda in its modern practice through fieldwork.

At first, I was reluctant to carry out fieldwork in Ayurveda because the following question would inevitably arise: How can one possibly hope to understand Indian medicine if one has neither education nor practical training in medicine? Indeed, at the time, about 10 years ago, it seemed to be a quite valid question to ask. Even though I had acquired a good knowledge of biology and chemistry in the course of my undergraduate education, I had not studied medicine *per se*. I was, therefore, understandably unsure and nervous about my ability to undertake fieldwork in modern Ayurveda. What I came to know later was that a physician's knowledge of medicine is not at all necessary to grasp the principles and practice of Ayurveda. In fact, in many ways, it can be an obstacle to the proper understanding of the theoretical basis of the system. Although a refresher course in basic biology and chemistry, and familiarity with basic medical procedure would have been useful, my knowledge of the classical system of Ayurveda proved to be more important than a physician's knowledge of medicine.

In order to gain an understanding of Ayurveda, I decided to undertake a course of study that would concentrate on three sub-disciplines of Ayurveda, viz. *Kāyacikitsā* or Internal Medicine, *Dravyaguṇa* or Pharmaceutics, and *Rasaśāstra* or Medical Alchemy. I chose these three because they afforded me the broadest possible exposure to Ayurveda, from the point of view of both medical theory and medical practice. I selected as my principle teachers Prof. R. H. Singh, Banaras Hindu University (BHU), Vārāṇasī, and Prof. P.H. Kulkarni, Āyurveda Rasa Śāla, Puṇa.

In April 1997, my wife and I arrived in Vārāṇasī for what was going to be two years of fieldwork, focusing on an intensive study of Ayurveda medicine. Seven months later, I was called to Denmark to head and to re-establish the programme in Indian Studies at the University of Copenhagen. Although, I was not able to complete the original fieldwork programme, I acquired a reasonable good background in ayurvedic practice.

Since I was asked specifically to focus on fieldwork in Ayurveda, I would like to devote the remainder of this that topic. I should like to

divide it into two parts. The first will focus on my experiences of Ayurveda in India, and the second will present my understanding of Ayurveda in the Western world and its relationship to the Classical System of Indian Ayurveda.

Ayurveda in India

The knowledge of Ayurveda in India today is, for the most part, transmitted through government Ayurveda Colleges scattered throughout India. The traditional apprentice system of *guru* and student still exists, but it is increasing more rare, as the *vaidyas* trained in this way, usually from father to son, are becoming fewer and fewer. New programmes are underway to re-establish in some way this traditional method of medical education. The easiest way to obtain ayurvedic education is via the government Ayurveda College, which follows a standard curriculum of ayurvedic education. Recently, several of these colleges have opened their doors to Western students and have designed special *curricula* for them (i.e., the Gujarat Ayurveda University in Jamnagar).

I have noticed that there is a definite tension existing between the *vaidyas* trained in the traditional way and those who received a certificate from an Ayurveda College, because the traditional doctors believe that Ayurveda is learned only after years of practice by the side of a *vaidya*, not by means of textbooks. This traditional point of view is supported by the ayurvedic classics, but does not at all respond to the demands of the modern world.

Although I would have preferred to study Ayurveda in the traditional way, both the restraint of time and the want of a traditional *vaidya* prevented me from following this plan. I, therefore, began my course of study at BHU, one of better and more comprehensive government ayurvedic universities. Much to my disappointment, Prof. Singh did not personally teach me the fundamentals Internal medicine (*kāyacikitsā*), but rather assigned one of his better students to take me through the steps from theory to practice, including diagnosis and treatment. We worked well together and I thought that I would learn much, but over the course of time,

the student's interest in me began to diminish, and after seven months, I was wondering around the Ayurvedic Hospital at BHU looking for my teacher and trying to make appointments when we could meet.

The theoretical basis of Ayurveda was already familiar to me from my previous study of the Sanskrit Classics, but I was anxious to know how it worked in practice. I was guided through the diagnosis process via the *doṣas* and *nāḍīparīkṣā*, and I was given ample practice with it, so I felt confident that I could diagnose the basic medical difficulties. The objective system of diagnosis by *prakṛti* and *doṣa* was easier for me. The subjective system of pulse-diagnosis was more difficult, and, from what I could gather was largely for show, as many *vaidyas* were very unsure about it.

In the course of my field studies, I was always interested in different *vaidya*'s opinions about pulse-diagnosis. In Banaras, I consulted Prof. Upādhyāya, who in his later 80s was the one of most well respected practitioners of *nāḍīparīkṣā*, being physician to Mahātmā Gandhi. He explained that he always had the sense for understanding ailments via touch, and that his refinement of pulse diagnosis evolved over a long period of time in conjunction with the practice of Yoga. In Puṇa, Dr. Nanal, a well-respected *vaidya* trained in the traditional manner, explained that he does not use pulse diagnosis because he never had the "sense" for it. He relies on the "objective" technique of *prakṛti* and *doṣa*-examination. These two physicians confirmed that pulse-diagnosis is not suitable for each and every ayurvedic physician, and in fact, is quite specialised for those who already have the "feel", "sense" and "touch".

I observed *pañcakarman* often, and came to understand the enormous therapeutic benefit derived from it. I, unfortunately, never had the occasion to perform a full-course of *pañcakarman* therapy myself, even though I would have liked to do so. I did, however, undergo a "modified" *pañcakarman* treatment at the clinic of Ram Pandey in New York, who included it as a central part of his *Kāyakaḷpa* regimen. At BHU, there is tremendous emphasis placed on *pañcakarman*, as it has become Prof. Singh's specialty. The results are impressive from the point of view of anecdotal evidence, for I am unaware of any clinical study of *pañcakarman*

that has been found acceptable according to the standards established by Western biomedical science.

Prof. Singh has been working with an Italian team and has set up a clinic based on the study and evaluation energy fields by the use of some rather technologically advanced looking equipment. I must admit that I am very sceptical about it, but it does point to an important trend in modern Indian Ayurveda: the modification of Ayurveda to accommodate Western interests and concerns.

The outpatient clinic process was a total bewilderment to me. Masses of people would come everyday to be diagnosed and treated by one or two physicians. All kinds of problems, some physical, but many psychological, would be diagnosed and treated by ayurvedic means. Most of the time, the treatment took the form of ayurvedic medicine. Psychological disorders were rarely recognised as such, and were routinely treated with ayurvedic medicines or not treated at all. The doctor would simply talk to the patient, most often a female, and her husband and/or brother who brought her in to the clinic. After rather firm and stern words from the doctor, she and her family members would be sent home, only to return again after a week or so with the same complaint.

My study of Indian pharmaceutics was wholly superficial, as there was only the most basic instruction and guidance given. I received a brief introduction to the theoretical basis of *dravyaguna*, followed by a tour of the botanical garden where numerous medicines were pointed out to me. I took numerous photographs of typical plants, with the hope of studying them from pictures. This has not yet materialised. The theoretical basis of *dravyaguna* remains a mystery to me. Many of the physicians I asked about it told me that they often use the terminology of *dravyaguna* quite freely, but no could actually demonstrate how it works in actual practice.

The knowledge I gained from an intensive study of *Rasaśāstra* gave me a far better understanding of the processing and use of minerals and metals in Ayurveda. I learned the theoretical basis of Indian Alchemy, and participated in the purification and processing of many shells, minerals, and metals, including mercury. Although the clinical studies carried out at BHU, indicated that alchemical medicines, when properly utilised, have

health benefits, I am convinced that over the long run they remain fundamentally harmful. What seems to be overlooked in this regard is the fact that the ordinary levels of toxic metals in the human body have increased over the course of time due in large part to environmental pollution, so that the therapeutic doses recommended in the traditional sources pushes the levels in the human body far beyond what is considered to be safe by modern standards.

The knowledge of *Rasaśāstra* that I gained has allowed me to notice that the use of Indian alchemy is not at all uniform throughout the ayurvedic pharmaceutical industry in India. This is cause for grave concern, not only for Ayurveda in India, but also for those who use Ayurveda medical round the world.

In my humble opinion, the entire ayurvedic pharmaceutical industry in India requires standardisation on the lines of that found within the pharmaceutical industry in the developed world. As I began to explore this matter further, I discovered that this issue was addressed nearly thirty years ago, when a team of ayurvedic experts compiled *The Ayurveda Formulary of India* in 2 parts (Part 1, 1978 [English], Part 2, 1990 [Hindi]), followed by the *Pharmacopoeial Standards for Ayurvedic Formulations* (1987). Few of the pharmaceutical companies I visited ever heard of this formulary, and none of them follow any uniform standardisation of drugs. Some form of traditional formulary usually serves as the basis of each company's formulations, but it varies from company to company.

I could go on to relate similar such experiences with my encounter with the practical aspects of Ayurveda in India, but the same story of enormous variation repeats itself time and again. Throughout my experience with Ayurveda in India, one thing remains fixed firmly in my mind. Although the ayurvedic classics of the *Carakasamhitā*, *Suśruta Samhitā*, and the *Aṣṭāṅgahṛdaya Samhitā*, were constantly referred to practitioners of Ayurveda as the principal sources of their medical knowledge and practice. These three textbooks, known as the *Bṛhatrayi*, "the ancient three", however, were seldom actually consulted or used, as most ayurvedic doctors have little or no knowledge of Sanskrit, and do not have slightest interest to read the old books.

When we look at Ayurveda in the Western world, we find that a different approach is used, which has different aims.

Ayurveda in the West¹

In the effort to gain knowledge of Ayurveda in the West, I focused on major trends in the North America, as that was where I was located at the time. I examined Ayurveda as presented and practised by the following organisations and individuals: Maharshi Mahesh Yogi's Ayurveda and Deepak Chopra's Quantum Medicine, Vasant Lad and Robert Svoboda, and the *Kāyakaḥ* of Ram Pandey and Scott Gerson. I visited the clinics of all but Maharshi Yogi's Ayurveda and Deepak Chopra, but I had the occasion to speak to representatives from both. These are the major popularisers of Ayurveda in North America, and represent what I have called New Age Ayurveda, as their fundamental philosophy follows the principles and ideology of the New Age in the West. Each has "trained" others, and generations of ayurvedic specialists are now beginning to emerge on the scene. The Indian tradition of *guru* and student is perhaps more alive in the Western form of Ayurveda than in its Indian original.

There are four basic characteristics that distinguish these advocates and practitioners as representatives of New Age Ayurveda. I should like to discuss each one in relationship to the classical form of Ayurveda found in India, so that a clear picture of the Western manifestation of Ayurveda is properly understood.

First, **Antiquity equals Authenticity**. New Age Ayurveda claims that Ayurveda has its origin in remote past, some 5000 years ago, and is the basis of all subsequent healing systems including Chinese, Greco-Roman, and eventually modern Western medicine.

Best estimates suggest that the beginnings of a codified medical system, eventually known as Ayurveda, probably began around the sixth century BC, as the earliest evidence of such activities is to be found in the

¹ For a more complete discussion of this topic, see K. G. Zysk, "New Age Ayurveda or What Happens to Indian Medicine When it Comes to America," *Traditional South Asian Medicine*, Vol. 6 (2001), pp. 10-26.

Buddhist's Pāli Texts that reflect the events of that time. Although some conceptual similarities exist between the ayurvedic idea of *doṣas* and the Greco-Roman notion of humours, there is as yet no substantial evidence to link the two medical traditions. Even more tenuous is any connection between Ayurveda and Chinese medicine from an early period.

Second, **Everything is Spiritual**. Ayurvedic medicine and Indian spirituality are inextricably connected in New Age Ayurveda. All systems of New Age Ayurveda include some significant component that involves the Yoga *āsanas* (postures) and meditation techniques. Classical Ayurveda consciously separated the medical training of Ayurveda from the spiritual and religious discipline of Yogic asceticism. Yoga has incorporated certain aspects of Ayurveda to promote and maintain general health, but Ayurveda has not included Yoga in its principles and practices. In India, Yoga and other forms of spirituality have always been readily accessible through the proper religious channels of priests and *gurus*, and ayurvedic *vaidyas*, like any other member of society, availed themselves of the spiritual and religious training as was appropriate to their position in society. Religion was an ever-present part of their life and did not need to be incorporated into the medical system. In the West, one of the principal motivations for the New Age movement was a search for spirituality that was somehow absent in the existing religious traditions. Indian spirituality filled the void for many New Agers, so that New Age Ayurveda, like other importations from India, had to be spiritually based, despite the fact that mysticism and meditation were never part of the original teachings of Ayurveda.

Third, **Harmonise the Mind and the Body**. In addition to the emphasis on spirituality, New Age Ayurveda holds mind-body medicine to be fundamental. Just as in Yoga and other spiritual disciplines proper training of the mind results in taming both the mind and the body, so also in Ayurveda it must be the case that the mind plays a major role in controlling the health and well being of the overall body. Modern science has discovered that thoughts do in fact affect the body. The biomedical technology of biofeedback has been used effectively for a couple of decades in treating migraine headaches and in stress management. Similarly, the study of energy fields in and around the body started years

ago with the experiments on "orgon" by Wilhelm Reich and others, who have become sort of cult figures of the New Age Movement. Nowadays, scientists are carrying on the work with more knowledge and more sophisticated technology. Their theories and discoveries have led to the sub-discipline of mind-body medicine that has become popular with the New Age movement. Linking Yoga with Ayurveda permits New Age Ayurveda to benefit from the work of Mind-Body medicine.

Rather than a mind-body connection, Ayurveda maintains an inherently micro-macrocosmic relationship between the human body its environment and emphasises rather physical than mental causes for diseases. What influences the world around the person also affects him or her. In its general aetiology (*nidāna*), classical Ayurveda mentions that mistakes in understanding (*prajñāparādha*) and unwholesome contacts of senses with their objects (*asātmyendriyārthasamyoga*) can result in malady. Mistakes in understanding include acts against the natural laws because of ignorance, loss of patience because of emotional imbalance, and loss of memory. These usually result from the impressions left from past lives or, what is popularly called *karman*. The second involves the misuse of the senses that result in the damage to the eyes, skin, ears, tongue, and nose, and their functions. These causes of disease do not derive exclusively from the individual's mind or thoughts, as modern mind-body medicine would explain it. Therefore, the mind-body medicine of New Age Ayurveda is something rather different from that of classical Ayurveda.

Fourth, **The Rediscovery of Truth. What is Natural is Good; What is Artificial is Bad.** New Age Ayurveda strongly argues that the ancient system of Ayurveda is based firmly on modern scientific truths that were known already in antiquity by the insightful *ṛṣis* and teachers of Ayurveda. The principles and practices may be formulated and expressed differently, but the underlying scientific bases are the same. Likewise, New Age Ayurveda claims that all the medicines and treatments that are employed are natural and therefore completely safe without toxic or harmful side effects.

As far as can be ascertained, modern scientific medicine and Ayurveda are still wide apart in their respective understandings of the

workings of the human body, and a common vocabulary of words and ideas has yet to emerge. Significant differences in conceptual understanding exist between the two medical systems, so that until a common language of discourse is established, dialogue between the practitioners of Ayurveda and the doctors of allopathic medicine will remain essentially at the superficial level.

New Age Ayurveda's insistence on gentle, safe, and natural healing is worrisome and a cause for concern. Its ignorance of classical Ayurveda in this regard can indeed be harmful to people. Despite their ideological premise that connects humans to nature, the texts, teachers, and practitioners of classical Ayurveda always caution about the possible dangers and mishaps that can occur from the wrong administration of a therapeutic procedure or the toxic effects from the wrong formulation, preparation, or prescription of a specific medicine. Classical Ayurveda would never claim that it was always safe. It would, however, maintain that the effectiveness or ineffectiveness of a particular remedy or medical procedure depends on the knowledge and skill of the physician. If a therapy failed or caused an untoward result, it was not the fault of the technique or the drugs employed, but resulted from an incompetent physician who did not diagnose properly, did not prepare the medicines correctly, or did not know the full range of effects of a treatment or remedy. Followers of New Age Ayurveda should heed the warnings clearly spelled out in the classical books.

Conclusions

The most recent manifestation of Ayurveda is found in the Western world. It combines the spiritual and ideological elements of the New Age movement with an ancient Indian medical tradition to produce New Age Ayurveda. Ayurveda has reached the Western world, but in a different form from which it began in India. The transformations that have occurred in Ayurveda reflect Western attitudes and concerns rather than internal scientific development of the system itself. What the final form of New Age Ayurveda will eventually look like depends largely on those

individuals in the West, who teach and practise it, and those in India, who support and encourage it.

In my opinion, we shall also want to pay particular attention to the effects that New Age Ayurveda has on traditional Ayurveda in India in order to follow the changes that have already begun within Ayurveda in modern India.

PATTERNS OF ENCOUNTER BETWEEN AYURVEDA AND MODERN MEDICINE

Shrinivas Tilak
Independent researcher
Montréal, Canada

Questions that the proponents of modern medicine ask of non-Western medical systems typically include – What is of medical or therapeutic value in them and if there is any, how can be appropriated into modern medical theory and practice? Related questions that beg response are – Why do traditional systems of medicines continue to persist in non-European societies in spite of the long history of introduction of modern medicine in their midst? How can we account for the (alleged) effectiveness of their therapies? Reflexively, what can be learnt about the effectiveness of Western healing through comparative study? One of the foremost dilemmas in non-Western systems of medicine is to understand how such treatments actually influence and improve the state of the patient. In the context of increasing pluralistic societies of Europe, another question that needs to be asked and answered is "How to facilitate the encounter, interaction, and coexistence of non-European systems of medicine with modern medicine? "

The present paper seeks to address the above questions in the belief that the exchange of ideas concerning human life and its values and meanings (including health and illness) among world cultures has a long tradition and the intersecting of medical systems with different cultures and societies has provided a rich context for understanding human aspirations and goals of life. True, in any particular case, how and which specific disease, the treatment for it and the use of specific medicines and ideas about their effectiveness are exchanged is an empirical question. But the study of models and patterns of such exchange and the historical and cultural context for related encounters are likely to provide a more useful focus for promoting health and welfare. With that objective in mind this paper proposes a framework for facilitating encounter between modern

medicine (also known as biomedicine or allopathy) and Ayurveda after a brief discussion of the past history of relationship between them.

Since conflict and disagreement are unavoidable in any encounter, what matters is how we respond to the conflict of interpretations. In the dialogical encounter such as proposed here (with insights gained from Richard Shweder 1991: 73-110), one must begin with an assumption that the other has something to contribute to understanding. The initial task is to grasp the other's position in the strongest possible light in which we can understand and conceptualise our differences. There is no need to score a point by exploiting the other's weaknesses; rather, we will seek to strengthen the other's argument as much as possible to render it plausible in a dialogical encounter where we reasonably explore our differences and conflicts of interpretations. The project underlining such encounters would involve the following steps of hermeneutic significance:

(1) Learning about the other worldview:

It is necessary for each partner in an encounter to put in a disciplined and concerted effort both to understand (1) the other's world and its horizon in terms of the other's cognitive categories, practices, languages, and symbols and (2) to recognise its internal logic and rationality that sustains them.

(2) Thinking by means of the other:

This refers to the process of consciously opting to study one's own tradition in light of the cognitive categories of the partner in the encounter (Ayurveda or modern medicine in the present context) in the hope that the other promises to answer the kind of questions that were raised above.

(3) Deconstructing and going beyond the other:

Here one recognises the other as a specialist or expert on at least some aspect of the human experience (health and healing in the present context) whose reflexive consciousness and system of representations and discourse may be used to reveal a hidden or implicit dimension or assumptions of one's own tradition and its hypotheses.

(4) The context of pluralism and multiculturalism:

Within the specific context of today's India and Europe any investigation into the other tradition's "thematic universe" or worldview must necessarily be predicated upon the realities of pluralism and

multiculturalism. It is only then that an open-ended and self-reflexive dialogue between the two participants can be fostered.

1. Past encounters of modern medicine and Ayurveda

Ayurveda, the foremost among the traditional systems of India's indigenous medicine, is considered to be an auxiliary limb (*upveda*) of the Veda. As a science of long and healthy life, Ayurveda is rooted in knowledge intuited by ancient seers and poets whose insights and visions are compiled in the Veda. Vedic knowledge is believed to provide comprehension that is more complete and truthful than knowledge gained through the senses. Modern medical and ayurvedic approaches to health, therefore, diverge in the way the two traditions regard knowledge. While Ayurveda in general gives more credence to knowledge acquired through intuitive and mystical sources, modern medicine values reason and science more strongly. Ayurveda exemplifies co-operation of empirical and intuitive knowledge, and attention to both earthly and spiritual concerns (Fields 2001: 4-5). It continued to enjoy high reputation and status in India and abroad over the millennia until the Mughal rule was established over most of India by the seventeenth century. The Mughals did not encourage Ayurveda and its neglect continued after the British gained political control over India toward the eighteenth century. Modern medicine's encounter with Ayurveda began with the arrival of the Portuguese in the fifteenth century when Garcia de Orta (b 1501) in his *Colloquios dos Simples e das Drogas da India* began to study the Indian *materia medica*. While he remained respectful of the classical authorities (Hippocrates, Celsus, Dioscorides, Pliny, etc.), he was at the same time willing to correct, contradict or amend their observations when his own observations or those of reliable colleagues convinced him that they were wrong.

"Don't try to frighten me with Dioscorides nor Galen because I am only going to say what I know to be true," said de Orta in his 9th Colloquy. In the 15th Colloquy, discussing cinnamon, he stated, "For me the

testimony of an eye witness is worth more than that of all the physicians and all the fathers who wrote on false information" (Bagchi 1997:119).

The British medical policy in India, on the other hand, was designed to serve the needs and expediencies of the Empire. Colonial medicine made medical attitudes, beliefs, and practices of Indians entirely dependent on imperial sense and sensibilities. An important project of colonialism involved control over the mind and the intellect of the colonised Indians. Indigenous knowledge was systematically usurped and undermined by the colonial authorities. Like most non-Western societies, Indian societies were (and indeed have so remained) diverse and pluralistic. India enjoyed a rich biodiversity of plants and animals that were used as sources of food and medicine. In turn this gave rise to a rich plurality of knowledge systems equally relevant in metaphysics and medicine. Under the colonial authority, however, the biological, medical, and intellectual heritage of India was devalued. The primacy given to Western medicine transformed India's plurality of knowledge systems into a *hierarchy* of knowledge systems. The horizontal ordering of diverse but equally valid and accessible medical and healing systems was converted into a *vertical* ordering of *unequal* systems with the Western medicine occupying the top rung. Western systems of knowledge were defined as the *only* scientific systems and the Indian systems of knowledge were dismissed as unscientific and inferior.

Since then, Indian intellectuals have continued to be overwhelmed by the alleged Western superiority of knowledge and technology. Psychiatrist Sudhir Kakar frankly admits, " ... I could not explore Ayurveda without an *a priori* idealisation or denigration, till a change in the Western theories of healing took place which in a sense accorded me permission to pursue an objective inquiry (1982: 223). " Now he is particularly attracted by the determination of ancient Indian physicians to invest the otherwise vague notion of wholeness with concrete content and goes on to state that today the latest scientific medical opinion with regard to nutrition, sleep, and healthy behaviour is squarely in the realm of Ayurveda (1982: 229).

Yet, in the nineteenth century some notable efforts were made to synthesise the better of the two competing medical systems in the hope that European theory and Indian experience, if amalgamated, would yield useful results that were beneficial and gratifying to both the contenders equally. One of the more prominent protagonists of this kind of conscious syncretism was Raja Sarfoji, the last Maratha ruler of Tanjore (modern Thanjavur). Having surrendered real power to the British Resident, the Raj spent his time in pursuit of knowledge. Fascinated by the different medical systems, he opened an institution for research named Dhanwantari Mahal, where he assembled leading physicians from the disciplines of Ayurveda, Unani, Siddha, and Western medicine. As a result of their interactions and investigations, the best among the tried and effective remedies were collected in a series of works named *Sarabendra Vaidya Muraigal*, which were composed by the court poet in Tamil to facilitate easy memorising and popularisation. According to Kumar this was perhaps a very early example of a methodical clinical research (1998: 69). Another remarkable person was Anandibai Joshi, the first Indian lady to go abroad to obtain a medical degree (1886). Though she appeared to conform to the prevalent social model of the submissive wife, Joshi did see a chance for a self-reliant existence for the Indian women through modern education. Her feminist sounding views were tempered with respect for the tradition of Indian medicine, which comes through in the topic she chose for her MD dissertation "Obstetrics among the Aryan Hindus" wherein she outlined in detail the "good rules laid down by ancient physiologists, regarding the hygiene of pregnancy, causes of abortion, accidents of labour, and the diseases of infancy" (Kumar 1998: 61-62).

Nevertheless, on the whole, India presents a typical instance where long after the formal ending of the Raj, the ideology and psychology of colonialism are still triumphant in many sectors of Indian life – including medicine. A colonial political economy began to operate in India seventy-five years before the full-blown ideology of British imperialism became dominant. Similarly, health policy continues to be informed by those professionals who have been trained in Western ideas and who share the professional goals and beliefs of their Western colleagues (Kumar 1998:

223-224). Academics studying history of Indian medicine, whether Westerners or Indians, are predisposed to an evolutionary perspective introduced by Erwin Ackerknecht, a physician-ethnologist, who may be seen as the "father" of medical anthropology. In his publications going back to the 1940s, he proposed a dichotomous classification of medical systems – primitive, magico-religious and modern, rational scientific.

Colonial medicine added its own legacy of competition and complexities to the already heterogeneous medical culture of India. Whereas biomedicine and homeopathy, the two more important vestiges of colonial medicine, kept striking deeper roots in the Indian soil, the indigenous medical systems correspondingly kept losing ground. The, *vaidyas* however, were quick to learn from their allopathic counterparts the practices of fixed consultation fees, high priced medicines, and publicity through advertisements. By the end of nineteenth century, the professionalisation of ayurvedic practice and the commercialisation of ayurvedic drugs on the Western model were well under way (Kumar 1998: 217). The medicalisation of Ayurveda by biomedicine has continued unabated even in post-independence India thanks to active attempts by official healthcare providers to impose a standard structure on diagnosis and curing practices. Today's sophisticated pharmaceutical companies have invented "double talk" to promote traditional medicine as modern. They market both traditional ayurvedic preparations and patent "ayurpathic" products taking advantage of the loophole in India's Drug & Cosmetics Act of 1940, which recognises both types. Traditional formulations include drugs, which follow classic formula noted in one or more of fifty-six specific ayurvedic texts. Patented ayurvedic formulations include combinations derived from ingredients mentioned in one of the texts. The recipe is the manufacturer's own and drugs do not have to be standardised or tested for efficacy or toxicity (Nichter and Nichter 1996: 292, 315 (n. 53).

The common conceit of the West that the benefits of biomedicine are obvious, as are the truths on which those benefits are based is a conceit also shared by most cultures and peoples regarding their own medical systems. Such conceit is discernible in the revivalist ideology that was

fostered in post-independence India to claim that the theory and practice of traditional medicine is an expression of Indian civilisation. Bagchi has observed that a careful study of the development of European medicine would reveal that it had assimilated a considerable amount of Indian medical knowledge and that the so called early European medicine was nothing but an admixture of Tibbi, Unani, and ayurvedic medicine improved by later developments in Europe, which was brought back into India in an European costume (Baghi 1997: 152-153). In his *History of Indian Medicine*, vol. II, G. N. Mukherjee drew attention to the contributions of Ayurveda to modern therapies. In support, he listed the use of salt-free diet to in the treatment of dropsical affections, the use of salt in the treatment of cholera, liquid food in typhoid fever, cooling regimen in smallpox and measles (Kumar 1998: 86, fn 222).

2. Viewing the other emically

This paper proceeds in the belief that the employment of a combined emic and etic views will facilitate productive encounter between modern medicine and Ayurveda. It was Kenneth L. Pike who coined the terms etic and emic in his *Language in Relation to a Unified Theory of the Structure of Human Behavior*. While etic refers to a trained observer's perception of the uninterpreted "raw" data; emic refers to how that data is interpreted by an "insider" to the system. This distinction has found its way into the field of medical anthropology because they can be served as basic cognitive categories through which one may encounter other world views or other perceptions of the universe. The detached, etic observer's view is one window on the world. The view of the local scene through the eyes of a native participant in that scene is a different window. Either view by itself is restricted in scope and leads to a kind of distortion. The first, because it ignores the concept of relevance, purpose, and meaning; and the second because it distorts or moulds vision or experience so that one interprets what one sees or hears or understands only through the coloured glasses of one's own experiential structure. Yet, emic and etic approaches are complementary to some extent. The participants in the encounter should

start with certain cross-cultural analytical principles to help identify an issue for discussion and then organise and interpret the relevant data. But they should consider their observations within the informants' categorisation and meaning system to provide an additional empirical dimension. At some stage in the encounter the participants should stop and process the agreed upon data in an etic framework of general analytical categories and theory (see Headland et al 1990).

3. Getting the other straight

Viewing the other emically may be facilitated by "getting the other straight, " that is, by putting in a disciplined and concerted effort both to understand the other world and its horizons in terms of its own practices, languages, and symbols by recognising its internal logic, rationality, and organisation. Unfortunately, the history of the encounters between modern medicine and Ayurveda suggests no record of deployment of the emic perspective from either side. The colonial tradition of scholarship continued to use ideology as an instrument for reshaping Indian systems of medicine till they almost became a pale version of the nineteenth century European medicine. Not much has changed since then, even though the colonial condition is now the post-colonial condition and the disciplines of Indology and anthropology have produced a more solid and reliable base of information with cultural detail and linguistic precision. Numerous conferences and seminars that have been held in Europe, North America and in India have generally ignored to employ a combined emic/etic perspective in order to get the other straight. So have participants of South Asian origin attending such conferences.

It is therefore not surprising that the editorial in a special number of the *Journal of the American Academy of Medicine* dedicated to the study of non-Western medical traditions begins by flatly claiming that, "There is no alternative medicine." There is only, it goes on to say, "scientifically proven evidence-based medicine supported by solid data or unproved medicine for which scientific evidence is lacking. Whether a therapeutic practice is "Eastern" or "Western," is unconventional or mainstream, or

involves mind-body techniques or molecular genetics is largely irrelevant except for historical purposes and cultural interest." Most alternative therapies have not been evaluated using rigorously conducted scientific tests of efficacy based on accepted rules of evidence. The lack of properly designed and controlled trials is a major deficiency. Until solid evidence is available that demonstrates the safety, efficacy, and effectiveness of specific alternative medicine interventions, uncritical acceptance of untested and unproved alternative medicine therapies must stop (Fontanarosa and Lundburg 1998).

From the side of Ayurveda, it is insisted that the salient characteristics of the approach of Ayurveda, is quite distinct from modern medicine. The term Ayurveda, P. V. Sharma points out, is singularly free from any direct reference to medicine, cure or therapy. It rather implies an approach to total life and living that is guided by the desire to live a long healthy life (*prāṇaiśaṇā*), desire to enjoy financial and material security (*dhanaiśaṇā*), and the desire to secure happiness in the life hereafter (*paraiśaṇā*) (Caraka *Sūtrasthāna* 11:5). He then goes on to list seven types of "triads" that Caraka introduces to facilitate the attainment of those basic desires (Sharma 1979: 23-45).

Yet, a proponent of modern medicine employing an emic perspective will not fail to realise that though the origin of Ayurveda is attributed to the intuitive and revelatory accounts of the ancient sages, later thinkers supplanted this knowledge with direct observations and inferences. It therefore is a product of an age when knowledge and wisdom, the mind and the body, were not bifurcated. When a person is confronted with a situation of stress that has become unmanageable and when no way out is seen, he/she may subconsciously "choose" or "invite" a specific disease by one's own actions. The symptoms of illness provide a rationale to escape from the otherwise unmanageable situation. This is what has been called "a double bind" situation, implying that an individual has to make a choice out of two unacceptable alternatives.

The question then is "Who is responsible for the illness?" Ayurveda's answer is – active purposeful sensate agents may cause illness, which may be construed as a penalty for disapproved conduct or lapse in

prescribed behaviour. Treatment involves reinforcing the capacity of the patient to attack the disease and/or by reinforcing the tissue that has been invaded. Since the patient is regarded as a unique and a non-standard being that is un-standardisable, a typical patient will react or respond to treatment in a unique fashion that is not amenable to standardisation. Furthermore, the uniqueness of each person is a product of a large number of variables that include factors of – geography, climate, season, race, familial background, body constitution, and diet.

Such interdisciplinary approach of Ayurveda is also discernible in the structure of the *Sūtrasthāna* of the *Carakasamhitā*. Its thirty or so chapters address such issues as the composition of the universe, its relationship to the physical body, maintenance of health, prevention of disease, principles underlying treatment, and compounding of drugs. Of the thirty chapters only three – second third, and fourth – deal directly with medical matters *per se*, i.e., elaborate lists of various drugs. Most of the remaining chapters are highly interdisciplinary in character. Medical subject matter is highly interspersed with material that may properly belong to the disciplines of religion, philosophy, psychology, ethics, and sociology (Pflug 1992:45-46). Nearly one third of this material is directly concerned with social aspects of medicine and life. The *Sūtrasthāna* seems to be governed by the twin concerns of medicine and sociology with comprehensive elucidation of philosophical, metaphysical, ethical, psychological, and religious issues appearing at regular intervals. These are designed to act as supporting structures delineating basic ideas about life, health, ill health, and death, which forms the base of application of ayurvedic therapy (Pflug 1992: 46).

The portrait and character of the ideal physician (*vaidya*) similarly reveals the interdisciplinary nature of Ayurveda. Caraka lists some thirty-nine qualifications of the good physician. He should be well versed in the basic principles of Ayurveda – aetiology, symptomatology, and management of good and bad health, the three pursuits of life, rules of dietetics, drugs, and regimens for different classes in the society etc. A good physician thus must demonstrate competence in the areas of medicine proper (e.g., aetiology of diseases), axiology (three pursuits of life; see

above), and sociology (norms and values of different social classes). Health is defined as a condition that is nearer to life than to death. The overall emphasis is on prevention, embracing maintenance and removal – maintenance of good health by removing obstacles in its way (Caraka *Sūtrasthāna* 5:13). In his commentary on this statement exhorting the importance of a wholesome diet, Cakrapāṇidatta provides the analogy of the flame of the lamp. The flame may be maintained properly burning only by providing a steady and sure supply of oil to the wick and by removing possible hazards to the burning function – wind, insects, etc.

The deployment of the emic perspective will also reveal to the empathic representative of modern medicine that the traditional therapy of Ayurveda eschews the use of high technology and laboratory reports in diagnosing and treating illness. It offers instead treatment, which depends upon the sensitivity of the patient and practitioner relationship and simple, non-technical, non-invasive methods (massage, meditation, nutrition, herbal remedies, heat treatment, etc.). Employing what may be construed as an emic perspective on Ayurveda, one modern scholar (A. Roşu) has argued that commitment to reason and the desire for rationality and, at the same time, respect for handed-down teachings is discernible in the attempts of the ancient ayurvedic physicians to harmonise the determination of one's deeds (*karman*) with *raison d'être* of healthcare. They claimed that it was not only piety but also hygiene which could counteract the mechanism of *karman* in such a way that a full measure of life of a hundred years or more could be possible. The analysis of means of knowledge (*pramāṇa*) applicable in the diagnosis of the diseases and the procedure for medical academic debates bear witness to the concern of the physicians for logical accuracy in their reasoning. The work of Caraka includes something without equivalent in the history of medicine, a short treatise on logic for the use of practitioners (see Pflug 1992: 151 n. 135).

As a therapy, then, Ayurveda appears to offer an alternative solution to the growing domination of high technology with all its impersonality and expense in health services. It ascribes the cause of ill health to more than just the purely biological factor and encourages the individuals to take responsibility for their own health by rejecting the

disempowered role of the submissive patient. The emphasis is upon the perception of health as a value in itself and upon the individual actively participating in the ongoing maintenance of good health. It provides an alternative explanation for the questions "why me" or "why now." It claims to offer a "vision" of the world and of life and not just diagnosis and tablets for illness. But what is even more significant, is the impression that Ayurveda seems to accept alternative or even competing approaches to healing as parallel truths, which need not necessarily contradict each other. To that extent its approach may be considered synergistic, pluralistic, and multicultural.

4. Thinking by means of the other: Ayurveda as exemplum

After having responded to one's other and gotten it straight in both detail and generality, the participants in the encounter will arrive at that point where each partner in the dialogue must turn one's perspective back on itself and witness to that "subjectivity-in-between" that each partner has become for its other. The eye now must eye itself. This, according to Shweder, is a "process of portraying one's own self as part of the process of representing the other, thereby encouraging an open-ended self-reflexive dialogic turn of the mind" (1991:110). Thinking by means of the other refers to the process of opting to study a particular medical tradition (Ayurveda in the present context) because it promises to answer the kinds of questions the existential and cultural legacy of modern medicine has asked. This is only possible if Ayurveda is recognised as a specialist or expert on at least some aspect of healing and human experience. Ironically, modern medicine, which was one of the last sciences to grow out of the traditional sciences in Europe and consolidate itself as a "proper" science in the nineteenth century, was the first major system of healing to try to do away with self-criticism and scepticism though it was and remains an integral part of most traditional and popular healing systems of the world. According to Nandy (1998: 147) the principle of falsifiability as enunciated by Karl Popper, which is so central to the positivist self-image of modern science, does not include within its scope any scepticism about the basic

philosophical assumptions or culture of post-seventeenth century science. Thinking by means of the other (i.e., Ayurveda in this context) would then initiate a process to bring to consciousness something which is vaguely sensed but underdeveloped due to the limitations imposed on consciousness by one's own cultural system of symbols and practices. Ayurveda can then serve as a potent source of insight and knowledge for a new, more holistic medical science.

Adopting such a perspective will suggest that biomedicine need not relegate Ayurveda's preoccupation with the pursuit of the spiritual self to psychopathology. It would be possible, in fact, to find a position between ayurvedic relativism and medical universalism in which practitioners as well as patients can and will share a similar "psychological modernity." The fields, relations, and energies of interpersonal psychology of Ayurveda may be better understood if they were seen in terms of contemporary physics wherein matter and force are interchangeable and where matter *is* energy. Following Deepak Chopra (1989), one may posit that the mind is a temporal phenomenon and energy transforming itself through time. Here one does not have to accept Chopra's system of categories in order to recognise that such an ontological critique could be easily applied to modern medicine from realms in addition to quantum physics, particularly from those various Hindu symbolic and medical systems in which the ultimate reality in the universe is energy.

Recent research on the aetiology of coronary artery disease, for instance, has shown that angina and infarction may be caused by coronary artery spasm, which may in turn be provoked by emotional stress or neurological impulses. Angina and heart attacks, therefore, are not random mechanical events but rather the results of neurological and mental processes. Such a process may be a complex one, which is open to both cortical and symbolic meaningful influences. Unfortunately, since it accepts Descartes' formulation of the thinking and unextended mind, and the unthinking and extended body, there is no ground in modern medicine for interaction of these human *quanta*, or *onta*, save some ephemeral mystical soul. Consequently, modern medicine lacks a generally accepted theoretical paradigm within which to evaluate and interpret such human experience.

Similarly, chronic pain experienced in the body and mind by the patient as well as in the phenomenal, social, and political body of the sufferer – lays bare the contradictions in the dualistic metaphor of the body and mind. Modern medical practice is designed to localise suffering in a discrete site in the body (or in the mind), a site which can be visible (or logically deduced) and subjected to therapeutic procedures. Chronic pain, however, resists such neat objectification and frustrates medical practices aimed at its localisation. Chronic pain consequently is proclaimed subjective and a functional disorder of the subjective self and is held responsible for producing its own suffering. Chronic pain patients thus find themselves rejected by standard medical practice and are often referred to institutional settings.

Another obstacle to successful treatment of chronic illness is the modern physician's apparent distaste for subjective information. The subjective aspects of illness – what patients say, desire, think, fear, feel, and care about and how and why they behave as they do toward disease, symptoms, doctors, their bodies, themselves, and others is seen an impediment. Yet, interpersonal meanings are important both diagnostically and therapeutically. They can be known in all their individuality only through attentive understanding of the patient's social/ritual network. Biomedicine accordingly formulates illness from an individualising perspective. Disease is thought to be resident in the individual body and the goal of treatment is to understand surface phenomena with reference to a deeper ontological order and to link symptoms and signs of physiological structure or functioning and to intervene at that level. Disease is held to be a natural course and the story of disease is without a personalised agent. The narrative and phenomenological structure of illness and the person who is agent of suffering, may be relevant to routine clinical practices only insofar as they reveal the pathological and physiological order, enabling the physician to formulate and document the case as a medical project.

The answer "It hurts here," in response to the examining physician's question, "Where does it hurt," is not one's first or immediate reaction to being ill. A better expression of illness would be something like, "I feel weak; I am anxious; I feel hurt." But the way the physician phrases

the question, there is no room for a subjective expression of pain; there is no room only for the "I" in an answer to the physician's question. The nature of scientific medicine is reflected in since, for it, how the patient feels subjectively is less meaningful than the objective statement about the state of the body. Localisation of a disorder, *à la* modern medicine, at very best, tells only little about why it occurs when or how it does. But as per Ayurveda, disease occurs not in the body, but in life. True, disease occurs in the body – in the sense of an ontological order – but more importantly it also occurs in time, in place, in history, and in the context of lived experience and the social world. Its effect is on the body in the world (Caraka *Vimānasthāna* 8: 92-93; Good 1994: 133). Narration and symbolisation are therefore crucial to the understanding of the experience of illness and to situate pain in relation to other events and experiences of life. Accordingly, Ayurveda envisaged training in the art of communication, narration, and symbolisation which was expected to prepare students for a career in medicine, devoted to the service of the sick. A student was taught methods of thought and inquiry and grounding in the principles of ethics and in other areas of the humanities. The teacher was expected to point out why determining biological, empirical, and rational answers alone was inadequate to provide for the care of the sick (Caraka *Vimānasthāna* 8: 28ff).

It is in this context that the two-fold definition of *puruṣa* (Caraka *Śārīrasthāna* 1: 16,17) proposed in the ayurvedic theory of the person may also provide an opportunity to mediate between *quanta* and *onta*, the two foundational categories of modern medicine. One may suggest that there are two kinds of entities, "material body" (*bhūtātman*, Caraka *Śārīrasthāna* 1: 84) and "witnessing person" (*sakṣi ātman*, Caraka *Śārīrasthāna* 1: 83) to which two kinds of predicates, "mental" and "physical" can be attached. Material bodies can correctly have attributed to them only physical predicates while persons can have applied to them both physical and mental predicates. The critical logical feature of this position would be that the concept of person becomes more basic than the physical and mental predicates ascribed to it. Person then does not have to account for either of these two *quanta* in terms of the other, yet lets us talk about human beings

in an intuitively familiar manner (compare with a theory proposed by Howard A. Brody as discussed in Moerman 1997: 249-250).

In light of the foregoing, by pressing into service the twin interpretative practices (symbolisation and narrative) of Ayurveda, one may more successfully address chronic suffering provided it is diagnosed by "invoking" the origins of suffering as well as "depicting" them. The usual medical understanding of diagnosis follows an empiricist, referential view of language – that language more or less accurately depicts the objective world, that other functions of language are metaphorical, subjective, and therefore secondary. But language is also intersubjective and constitutive of lifeworlds whose invocative function is more primary than the describing or depictive functions of language (Good 1994: 133). In recent years, therefore, a narrative approach has taken root in the social sciences, which, like Ayurveda, recognises that the important human phenomena are not, strictly, natural events like the movements of planets or clouds, but they are personal, social, cultural, and historical events. Grief and depression, disease and pain constitute incidents in the ongoing life histories of unique individuals. Medical terms relative to such events in different cultures or in different segments of a single culture do not have a common reference to biological facts external to culture that can provide a basis for comparison and translation. Medical terms have as much to do with experience, gender, and society as with biology. Their interpretation requires attention to the complex array of conceptual systems in which they participate as well as to the practices through which these systems are enacted and reproduced. Formative practices that shape illness and illness experiences are inherently social. The meaning of illness is constructed through narrative practices in which sufferers, their families and other associates, and healers participate. Like the meaning of a text, the meaning of an illness narrative is often the complex product of multiple authors. It lies neither in the text itself, nor in the reader/hearer but is a social product and is socially distributed.

On the strength of the preceding discussion, the method and practice of narrative shaping of illness, such as it is advocated in Ayurveda, may be considered for a cross-cultural investigation of chronic illness experience, which is different from the standard paradigms of the medical

behavioural sciences. In fact, the 1990 issue of *Social Science and Medicine* on qualitative research on chronic illness made a plea to the medical profession to draw upon the narrative and other forms of conversation analysis to study the experience of chronic illness in Europe.

Encounter with Ayurveda and thinking through its cognitive categories would help reveal two other basic issues that underlie the manifest crises of modern medicine – first, the problematic reconstruction of the reality of the patient through standardisation of the dyadic relationship between the patient and the physician within which a therapeutic encounter takes place; second, emergence of the physician as a specialist, professional, and an applied scientist rather than a healer. In the process the patient becomes methodologically decomposed as person. As a positivist science, modern medicine reduces the patient from an experiential reality to an experimental one reinterpreting in the process his/her illness as somatic, psychological or psychosomatic. While the modern physician is skilled in making the accurate diagnosis of the disease, he/she does not seem to have the clue to the proper diagnosis of the patient. In modern medical practice, therefore, each type of illness now requires a different kind of professional expertise, whereas in the ayurvedic vision of health there is only one form of illness – the psychosomatic (Nandy 1998: 154). By contrast, the ayurvedic classification of disease and treatment seems porous enough to leave "ready-made niches" for alternative forms of therapy saving it from the twin perils of modern medicine – trendism and hyper-specialisation.

5. Ayurveda through the eyes of modern medicine

As proposed in the introduction, appreciation of the salient features of Ayurveda by modern medicine must be balanced by a critical self-reflection by the proponents of Ayurveda through the eyes of modern medicine. It will then be realised that in modern India, the ideology and practice of Ayurveda is little different from those on which modern medicine operates. While it may reject the philosophical tenets of allopathy, Ayurveda does not offer a political critique of health service practices. In

the Indian context, modern ayurvedic practitioners tend to join hands with biomedicine in not sufficiently acknowledging the important link between an individual's health and the broader social milieu in which he/she lives (such as the impact of the social class), and thereby serve as merely one facet of the institution of medicine's role in legitimising and obscuring the prevailing asocial inequalities leading to ill health.

The re-emergence of Ayurveda as a serious competitor in the medical market place has resulted in a power struggle over whose body of knowledge is the best to treat illness. Modern medicine has always been able to cite its "scientific" and "rational" basis as the selling point. "Unscientific" concepts of spirituality, balance, vital principle, etc., which are assumed in holistic therapies such as Ayurveda, are not accepted by modern medicine. Since the latter has been legitimised under the rubric of a scientific discipline, it has managed to have the scientific paradigm of medical care accepted as "the" paradigm, accusing ayurvedic practitioners of invoking magical beliefs without scientific basis. The irony is that for most users of modern medicine the symbols and ritual of medicine are just as mysterious as those used in alternative medicines. In response to such criticism, today's ayurvedic practitioners in India have attempted to legitimise their practice by introducing standardisation and licensing. This movement toward credentialism may offer some protection to the consumer. The corollary, however, is that by emphasising the "professional" aspects of their crafts, alternative practitioners are more likely to approximate the patient-doctor model of treatment prevailing in biomedicine, in which the patient is generally thought to be submissive.

Given that it is this very approach, which so alienates many who turn to alternative medicine, ayurvedic practitioners, may well diminish one of their main attractions (Lupton 1994: 127). Many of the practices of alternative medicine commodify alienation, for "personal" problems are temporarily relieved, as a particular practice tends to adjust the individual to the society from which the pathology has risen. Since enthusiasts of such therapies tend to come from the middle-class, they have little to offer people of low socio-economic status. Alternative therapies like Ayurveda therefore are likely to generate some of the more dubious aspects of

medical ideology – including notions of health and illness with medicalised and functional meaning. They will thus do little to challenge the medical paradigm for they become more interested in practice and procedure than in symbolic meaning. Indeed, they may become more insidious because they may overtly seem to offer an alternative to the prevailing model of health care while covertly legitimising social inequality (Lupton 1994: 128-129).

6. Medical practice and hermeneutics of suspicion

Any thinking through other involves passing through the other and intellectually transforming it into something else (perhaps its negation) by revealing what the life and intentional world of the other has dogmatically hidden away, namely, its own incompleteness. The hermeneutics of suspicion (see below) properly begins here where the potential for cross-cultural misunderstanding or even rejection may become great. The discipline of Indology has always prided itself for being an iconoclastic discipline. Unfortunately, when it comes to the field of medicine in India, its conclusions have often been subversive to the proper representation of Ayurveda. Methodologically, it seems to have perfected a radical hermeneutic of suspicion that tends to operate on the assumption that the deployment of myths and rituals and frequent allusions to dreams and visions in ayurvedic texts, theory or practice help disguise meanings or agendas that are not readily discernible on the surface. The project of modernity has frequently been predicated upon a radical break with the past. In the contemporary movements of philosophy, theology, etc., we find repeated calls for a demythologisation of tradition. Indology is no exception to this trend and the critical demand to demystify medicine in India (including Ayurveda) originates in this stance.

Most contemporary critics of the dominant role of mythology and ritual in Indian medicine (Debiprasad Chattopadhyaya, for instance) have focused on myth's ideological function as a mystifying consciousness. Their approach resembles what has been termed a "hermeneutics of suspicion" by Paul Ricoeur. It interprets myth as masked discourse, which conceals a real meaning behind an imaginary one. The task Chattopadhyaya

et al. set for them is to unmask this illusion, to uncover the hidden truth. To accomplish this project of unmasking myth, Chattopadhyaya (1977) takes his cue from the investigative methods developed by Marx (along with Freud and Nietzsche, – the three musters of suspicion" as Ricoeur calls them). Marx proposed a critical hermeneutics of "false consciousness" aimed at exposing the covert connection between ideological myths (or superstructures) and the underlying realities of class domination exemplified in the struggle for the ownership of means of production or infrastructures).

Yet, hermeneutics, as Ricoeur insists, has a double duty: to "suspect" and to "listen." There may be an ulterior meaning to myths in addition to their anterior meaning. While confirming the necessity for such a "demythologising" strategy we must, therefore, ask if this critique is not itself subject to critique. In this way, we may be able to recognise another more liberating dimension and meaning of myth behind its negative ideological dimension and meaning. Only by supplementing the hermeneutics of suspicion with what Ricoeur calls a "hermeneutic of affirmation," may we begin to discern the potentiality of myth for a positive symbolising project which surpasses its falsifying content (Kearney 1991: 66-67). The virtue of myth resides in its ability to contain more meaning than a history, which is, objectively speaking, true. This is what Ricoeur calls "saving myth" by demythologising its ideological perversions and misuses. To save myth from ideology is to safeguard it as a poetics of the possible (Kearney 1991: 69).

The project of modernising and demystifying Ayurveda is usually modelled after modern clinical medicine, which is held to be the paragon of rationality and objectivity. The fact, however, is that in the domain of clinical medicine, which deals with ill persons, there are two features with which rational and empirical theory of values deals inadequately: (1) individual differences (traceable to age, social class or status, and gender) and (2) differing levels of lived life as social roles and system. This weakness of empirical medicine is crucial because no proper understanding of the illness of a particular patient can be achieved without reference to levels distinct from biology or physiology, i.e., interpersonal relationships.

Another significant obstacle to successful treatment is the physician's apparent distaste for subjective information. Medical education and consequently medical practice, is not allowed to move away from the direct relevance to clinical medicine. The subjective aspects of illness – values about desire and fear and how and why patients behave as they do toward disease, symptoms, doctors, their bodies, themselves, and others are deemed to be an impediment. Yet, personal values and meanings are important both diagnostically and therapeutically, they can be known in all their individuality only through attentive understanding of the patient's social network.

Difficulties such modern philosophers and historians of Indian medicine as Chattopadhyaya and others encounter in their project of modernising Ayurveda originate in their trendily Cartesian, rational and/or Marxist leanings which vainly attempt to model medicine after physics or mathematics. René Descartes, whose thought was conditioned by (and contributed to) a mechanistic view of person and world, was interested in the philosophy of medicine, which he names as his foremost concern in his first published work, *Discourse on Method* (1637). Descartes considered his medical philosophy as an application of his physics, which grounds both his medical philosophy and ethical theory (Fields 2001: 14). The damaging social effects of Cartesianism supply compelling reasons to challenge it since its hierarchical dualism has been used to subserve projects of oppression directed toward women, animals, Nature, and other "Others" (Leder 1990: 4).

The Cartesian ideological straitjacket inhibits greater and broader concern with the values and meanings held by ill persons since it maintains the exclusive focus on empirical and rational dimensions of disease. Thus, according to Chattopadhyaya and others, medicine should be narrowly disease-oriented and must not take on the pretense of social or moral missions, which it is not capable of accomplishing. They would seem to dismiss other goods of Ayurveda as outlined in the *Śārīrasthāna* of *Carakasamhitā* (spiritual liberation or happiness in the life hereafter for example) as inappropriate and extraneous to the central task of medicine (Chattopadhyaya 1977: 375). But partners in dialogue with Ayurveda must

recognise that the hermeneutic of suspicion is but a tool, not an absolute truth and that it must be followed by a hermeneutic of restoration.

It will then be realised that bio-psycho-social model of medicine, which is implicit in Ayurveda (see for example *Sūtrasthāna* in *Carakasamhitā*), holds that the physician's basic professional knowledge and skill must span the social, psychological, and biological for his decisions and actions on the patient's behalf involve all three. The role of medicine is to provide effective help to individuals who present to the medical system with clinical problems that are informed by the patient's worldview. The *Śārīrasthāna* of the *Carakasamhitā* explains why some individuals may experience as "illness" conditions that others regard merely as one among many "problems of living." Modern historians and philosophers of Indian medicine such as Chattopadhyaya have neglected to acknowledge an organic relationship existing between Ayurveda, yoga, and the *dharmaśāstras*. For Caraka, Suśruta, and Vāgbhaṭa on the one hand and Manu, Yājñavalkya and Kātyāyana on the other, medicine and sociology have a common concern with the normative-medicine prescribing the right conduct of the body and philosophy the right conduct of the soul, as well as the social and ritual life. Ayurveda thus seems to recognise that the personal troubles that patients bring to doctors may have roots in cultural and social values and issues beyond medicine. While medical encounters involve "micro-level" interactions between individuals, these interpersonal processes really occur in a social and cultural context shaped by "macro-level" values and structures in society.

By contrast, Chattopadhyaya focuses on the universals – on disease causation; not on the actual particulars (the ill patients) who require the physician's help. His emphasis on the somatic or physical aspects of these universal pathological processes tends to oversimplify the understanding of causality. Furthermore, his aetiology of disease concentrates on the broad universals and neglects the fine structural and human details: the subtle complications and the intertwining multiple causal chains, which arise from the interaction of the disease with the host or patient that produces illness. The rational, empirical scientific view of medicine endorsed by Chattopadhyaya does not envisage the patient as a

whole person, but only as a body, which in turn is regarded as an assemblage of various parts. This deprives the patient qua patient of his/her moral and social dimension. In trying to avoid the error of social determinism that he detects in the *dharmaśāstra*-induced chapters of *Śārīrasthāna* and *Sūtrasthāna* in the *Carakasamhitā*, Chattopadhyaya falls into the opposite error of scientism.

The *dharmaśāstras* seek to resolve the scientism (in which Chattopadhyaya seems to land himself) by introducing the family and community as the additional *loci* of care giving process. They also introduce the ontological dimension of embodiment (*jīva*) to the purely conceptual and intuitive entity of self (*puruṣa*). Because ultimately, it is what we think and perceive a person is that determines how the person should be treated when ill (see discussion on *puruṣa* above). Chattopadhyaya errs in isolating persons as patients from their social context and from the roles they play in the family, at work, and in society. Ayurveda, by contrast, seeks to install a socially determined identity. We are what we are in virtue of our relationships. It seems to ground all essential features of personhood and any autonomy and rationality the person may possess, in a network of role relationships. If we accept the ontology of personhood (*jīva*) as represented in the *Śārīrasthāna* of the *Carakasamhitā*, then the positive content of treating the patient as a person conforms closely to the context and role relationships. Disease itself then becomes a manifestation in relationships because the whole being of the person is imbedded in those relationships. Healing comes to be redefined as reversing or re-balancing the disturbed role relationships (analogous to the disturbed balance of the humours).

7. Ayurveda through a reflexive self critique

Demythologisation of Ayurveda as proposed by Chattopadhyaya is of course an indispensable corrective to the conservative apotheosis of tradition as a Monolith of Truth though it can be pushed to the extreme. The need to continually re-evaluate one's tradition and cultural heritage raises the central question of myth as narrative. Myth, understood as human

endeavour to make sense of history by telling a story, relates to tradition in two ways. By critically scrutinising the past it can wrest tradition away from the conformism that is always threatening to overpower it. But by creatively reinterpreting the myths of the past, narrative can release new and hitherto concealed possibilities of understanding one's history.

A reflexive self critique by proponents of Ayurveda through the eyes of modern medicine will concur with Chattopadhyaya's assessment that the *dharmaśāstra* inspired socialisation of the patient is an incomplete solution to the problem of illness because it ignores the uniqueness of the experience of illness as well as the person's role as determinant of his/her own healing. Ayurveda may be faulted in its concept of personhood as determined *solely* by social and role relationships. With Chattopadhyaya's insight (culled from the etic perspective that he brings to his method and encounter with Ayurveda), it may be possible to propose a more balanced concept of personhood that permits attention to *both* the social and the individual aspects of illness and healing. Following Chattopadhyaya, perhaps it would be possible to acknowledge the contribution to illness of disturbances in role relationships and their reversal in cure without necessarily endorsing an ontology of person as a socially determined entity. One may then grant Chattopadhyaya his thesis by conceding that while Ayurveda stresses the patient's duties as a patient it also undervalues the individual rights and freedoms that are in no way diminished by the fact of patienthood.

A self-critical examination of Ayurveda using the perspective of modern medicine will reveal another major disturbing trend among its practitioners in modern times – the tendency to equate disorders described in the ancient texts with diseases and syndromes recognised in modern medicine. This unfortunate turn may be attributed to the ongoing competition between the two. Many advocates of Ayurveda go so far as to claim that there is nothing new in modern medicine, since all knowledge is already contained in the old Sanskrit treatises. But more realistically, Ayurveda needs to question and reflect upon the observation by Western scholars that practitioners of Ayurveda traditionally did not (and do not today) keep to the precept that for each individual patient a unique

medicine should be prepared. It should be suited as best as possible to that very person, his/her symptoms, habits, and the circumstances of life. Meulenbeld has observed that at least from the time of the *Yogaśataka* (ca.700?), ayurvedic texts describe mostly compound medicines (*yogas*) against diseases and do not primarily contain rules for the preparation of individual medicines. In the course of centuries, a large number of *yogas* have evolved and the range of their application has been extended or narrowed down. He has also observed that there is not a single book or article that gives an accurate description of the way in which a practitioner diagnoses his patients along traditional lines. The same applies to many aspects of therapy. Case histories are still very scarce in recent publications and even completely absent or unknown in Sanskrit medical literature, as distinct from the medical literature in Arabic and Persian (Meulenbeld 1984: 119).

Could Ayurveda become an alternative system of medicine providing relief to the problems of health in countries such as India that are faced with chronic poverty and social inequalities? As in most developing countries three types of medical systems are operational in India today: (1) modern medicine (allopathy), which is often elite-oriented and expensive, (2) the traditional or classical medical systems such as the Ayurveda, Unani, etc., which are hardly less expensive and which in reality serve as complementary treatment to allopathy; and (3) socially oriented "people's medicine," which is administered to the vast majority of the masses by local practitioners at the village level. It is possible for a system such as the Ayurveda to provide a bridge of discourse to both the modern and people's systems of medicine in India.

But to fulfil such a role, Ayurveda must be modernised without exposing it to the forces of Westernisation. Any such change must be consistent with India's social, moral, and cultural ethos. Perhaps a post-Gandhian approach, such as proposed by Vinoba Bhave, may be considered since it is predicated upon slowing down the rate of modernisation so that change is absorbed with little disruption. Pflug believes that India has a genius for this kind of change – movement without actually moving, activity without much overt action, furious work without immediate

tangible results (Pflug 1992: 120-121). It can also rely on a long tradition of adjustment to change initiated from within (which is what development is all about), rather than change imposed from without, which is growth without development. It is also heartening to note in this context that lately, a self-consciously "critical" approach, which seems to recognise the restorative function of hermeneutic, has begun to emerge in contemporary India. It reflects a growing interest in history and historical analyses of colonialism, political economy, and "subaltern" studies as they apply to representation of health and illness in the tradition of India. Such studies are an effort to understand health issues in light of the larger political and economic forces that pattern interpersonal relationships, shape social behaviour, generate social meanings, and condition collective experience (see for example, various articles in Rao 1999).

8. Ayurveda in encounter with modern scholarship and research

Historically, Ayurveda has consistently demonstrated a remarkably trans-culturative capacity which comes through its paradigms pertaining to diagnosis, aetiology, therapy, and recovery that have had a particularly wider appeal beyond India. Yet, modern scholars of Ayurveda tend to downplay the rational component of Ayurveda and overstate its allegedly exotic and magico-religious dimensions which is disturbing. This is discernible, for instance, in *Studies on Indian Medical History* edited by G. Jan Meulenbeld and Dominik Wujastyk; *Contagion: Perspectives from Pre-modern Societies* edited by Lawrence I. Conrad and Dominik Wujastyk; *The Jungle and the Aroma of Meats: An Ecological Theme in Hindu Medicine* by Francis Zimmermann (1987), and *Asceticism and Healing in Ancient India: Medicine in the Buddhist Monastery* by Kenneth G. Zysk (1991). Equally disturbing in such works is the unwillingness to let the foundational texts of Ayurveda to speak for themselves. Contents of these texts are isolated, dissected, and unraveled as per the whim of a particular scholar. Zysk, for instance, sees in Ayurveda (1) a Buddhist stream that he praises for providing Ayurveda with a "rational", "ethical", and "modernizing" base and (2) a Hindu [Brahminical] stream that he faults for

impeding the growth and development of Ayurveda by introducing into it "magical", "mystical", and "mythical" elements (see Zysk 1991).

This line of interpretation is suspect because ayurvedic tradition has been sustained from the beginning by a plurality of concepts and practical approaches mirroring the cultural multiplicity of Indian society. Since its therapeutic spectrum is diverse Ayurveda cannot be evaluated on the standard of rationality alone. Since ill health has roots in cultural and social values and issues beyond medicine, health care delivery should take place within "micro-level" interactions between patients and health care personnel. Because ultimately, it is what we think and perceive a person is that determines how the person should be treated when ill. It tells us what patients may expect and what physicians must provide in the central act of medical care. The fact is, historically, health care delivery has occurred in India in a social and cultural context shaped by the existing "micro" and "macro" level values of Indian metaphysics.

The living human system in Indian metaphysics is deemed to be a micro-cosmic mirror of the [macro] cosmos where these two expressions originate in the same elements and energy and subject to the same natural laws. This paradigm (also shared in Ayurveda) is compatible with the idea that everything in the universe is interconnected and interpenetrated. The body accordingly has the capacity to assure the ultimate good of the individual (no matter how ill-treated it may be) since it contains within itself the power to bring about a return to the condition of normal well being perceived as good health, providing the right methods are employed to enable it to do so. Health thus is deemed to be a natural and normal state of the human being which can be maintained by the wonderful, normalizing, building and healing "intelligence" that Ayurveda calls the vital force (*prāṇa*). These particular forms of knowledge gleaned from ancient healing traditions from across the world (that scholars are making accessible to all today) are poised to provide a useful basis of encounter between medicine and culture in the East and West (see Tilak 2007).

Charles Krippner refers to an interesting anecdote in this connection. When a workshop organized in Malaysia by the World Federation of Mental Health suggested collaboration between the university

department of psychiatry and the traditional Malay Bomoh healers, the local psychiatrists objected, claiming that such a move would only confirm the prejudice held by other departments in the medical school that psychiatry is unscientific. Biomedicine (and Western psychotherapy) concludes Krippner, has its roots in shamanism and needs to explore avenues of potential cooperation with the Bomoh model of healing that still contains wise insights and practical applications (Krippner 1994: 140). When the body mends a sprained ankle it is not considered a miracle; but when it rids itself of cancer, it is. Why? Because it is difficult for the modern mind steeped in empirical medicine to believe that the two apparently different types of healing processes may spring from the same well. The fact is, the body is capable of doing much more than we normally assume it can. This ability to cure disease from within is now receiving increasing attention. Consciousness exists in every cell of the body and each cell knows how to restore the balance and heal itself. Since it is in command over the basic physiological functions, the body has the potential to battle cancer, heart disease, and aging itself (see Tilak 1989).

From the perspective of Ayurveda the mechanistic and dualistic model of modern science is inadequate to explain the genesis of ill health or the body's capacity to heal itself. The distinction between the body and mind held by modern science is based on the idea that consciousness is merely an epiphenomenon of matter. Medical science engages in the study of pathological expressions of life; not life itself. The brain cannot distinguish between the reality and a thought about reality because it releases the same set of chemicals when excited by either of the two. Worry about a potential event causes as much pain and toxicity as the actual event if the latter were to materialise in reality. It is now recognized that the emotion of anger may cause inflammatory disorders; that anxiety and guilt are connected with diseases such as cancer. It is, therefore, necessary to distinguish between the mechanism of disease production and promotion of good health. The genesis of health therefore is different from the genesis of disease.

By recognizing the universality of scientific rationality with certain qualifications, the value and reasonableness of the "other" non-Western

medical systems like Ayurveda can be accommodated. Such seems to be the rationale behind the World Health Organization's (WHO) decision in 1976 at the Canberra convention to recognize ayurvedic medicine and support its integration into modern medicine in India. This point is also made by George Lundberg, editor of the Journal of the American Medical Association (JAMA), which devoted the entire November 1998 issue to alternative treatments ranging from acupuncture to yoga. JAMA chose this theme at the request of its readers. One of the articles presents findings of a study undertaken at Harvard Medical School investigating current interest in alternative medicine in the United States. According to David Eisenberg Americans have started visiting alternative medicine practitioners in increasing numbers than ever before. The United States Congress has taken cognisance of this fact and has allocated the sum of fifty million dollars to establish the National Center for Complimentary and Alternative Medicine and the Office of Alternative Medicine has been opened at the National Institute of Health, Bethesda. Similarly, medical schools in the United States have begun to teach alternative therapies. In 1997 sixty schools included the subject in existing required courses (Eisenberg 1998: 1569-1575). The guest editorial by Wayne B. Jonas of the Office of Alternative Medicine has endorsed this growing trend (Jonas 1998: 1616-18). Encouraged by indications that Ayurveda could provide relief in certain chronic, metabolic or stress-related conditions, some private institutions have currently embarked on research on the efficacy of ayurveda as a complementary health care system.

National Institute of Ayurvedic Medicine (NIAM) in the United States, for instance, has initiated collaboration with "mainstream" research institutions. With National Cancer Institute (Bethesda, MD) it is evaluating a traditional ayurvedic phytomedicine (*Semecarpus anacardium*; (Linn.) for anti-tumour effects. With Central Council for Research in Ayurveda and Siddha Medicine (New Delhi, India), NIAM has sponsored a specific herbal yoga and meditation treatment protocol for asthma, which is being evaluated in a randomized and controlled crossover type study. The project with Hinda Rosenthal Center for Alternative and Complementary Medicine at Columbia University (New York) involves the collection of data on

ayurvedic herbal medicines could be useful in the treatment of women's diseases and conditions: peri-menopausal symptoms, pre-menstrual syndrome, and painful menstruation (dysmenorrhoea).

9. Pluralistic and multicultural context of medicine

Ayurveda developed within an over-all historical context of pluralism and has generally shied away from the trend to elaborate a unified theory, which did not find favour in the intellectual climate of India. The long tradition of medical pluralism, as discussed above, continues in modern India. Such a pattern of encounter among competing medical systems in a traditional society such as India's, which is primarily based on kinship relationships, provides a sharp contrast to societies that function primarily through political and economic institutions. In Europe (and in North America) groups pressuring public opinion regarding proper professional help in regaining health were instrumental in institutionalising the elimination of most alternative systems of health care so that biomedicine won the field. This was accomplished toward the beginning of the twentieth century when advocates of biomedicine managed to marshal all the strategic resources at their command (the political, the judicial, the scientific and including technological advances) and by deploying the myth of growing public confidence in the idea of progress and the power of modern medicine (Romannucci-Ross 1997: 5-6).

Today, however, European cultural landscape is changing and the European Economic Community is fast acquiring a pluralistic and multicultural face. Medicine in modern Europe is becoming a sensitive indicator of the dominant cultural characteristics in this era, for human behaviour is necessarily rooted in the conception that humans construct of self and the universe. Every culture develops a system of medicine, which bears an indissoluble and reciprocal relationship to the prevailing worldview. The medical behaviour of individuals and groups, accordingly, becomes incomprehensible apart from general cultural history. Over time, and in all communities, human beings develop social institutions, etiological theories, and therapeutic techniques to enable them to cope with

the social and other inconveniences resulting from illness-induced disability. Thus, it is socio-cultural adaptive strategies that bring into being medical systems, the corresponding culturally based health behaviour, and belief forms that arise in response to threats and disabilities posed by disease (Pellegrino and Thomasma 1963: 10).

In such a fragmented view of disease, aetiology is increasingly being challenged in a pluralising Europe and there is growing awareness to replace it with a new paradigm akin to Ayurveda. In his examination of similarities in therapy and healing from a cross-cultural perspective, Jefferson Fish identifies themes of global significance that can bring some order to an otherwise bewildering range of cultural practices. These include: (1) the increasing trend of globalization and the spread of Western cultural forms (including medicine and therapy) with some cultural diffusion in the other direction too; (2) the fact that patient as well as healer behaviour is created by (and helped by taking into account) social structure and economic and power relations in the larger society and its institutions; (3) illness behaviour and its solution through healing are expressive of culturally determined patterns of normative and deviant behaviour; (4) the tendency across cultures to illness or health behaviour of individuals as part of a larger interactive social matrix; (5) recognition of the role of expectancy in the production and cure of illness in most cultures; and (6) cross-cultural application of general psychological principles of learning and cognition to changing behaviour, even though the culture content may vary dramatically (Fish 2004: 72-79).

The recently adopted policy of promoting multiculturalism in some countries of Europe (Great Britain for instance) would help redefine relationships between modern medicine and traditional medical systems along the lines suggested by Fish. Toward that objective, the activism and work initiated by Lind-Af-Hageby and others in England in the 1920s during the debate over the registration of medical practitioners should also be looked into for direction. They convened a conference on medical liberty and declared the right to medical freedom to be a civil right. They advocated the right to choose one's treatment, the right to forego treatment,

and the right to resist the passing whims, fads or fashions of orthodox and unorthodox medicines (see Nandy 1998: 176-177).

Globally, the ideal of multiculturalism arose to address the problems of societies that tolerated the presence of new cultures amidst them without creating real bridges between the host culture and the new cultural ideas and practices brought in by new citizens. The long experience of India as a multicultural country suggests that we cannot speak any longer with a single authoritarian voice concerning health beliefs and cultural logic of a given medical system. Disease and human suffering cannot be comprehended from a single perspective. Science and its objects, the demands of therapeutic practice, and personal and social threats of illness cannot be understood from a unified or singular cultural perspective. Russian literary critic Mikhail Bakhtin's image of a "multiplicity of tongues, mutually animating each other " would be an apt image for the sort of encounter that is required in the context of growing medical pluralism and multiculturalism in Europe. There are three principle policies that may be found useful in promoting pluralism in medical theory and practice in modern Europe: (1) recognition by the state of the cultural plurality existing at the heart of civil society; (2) reduction of the obstacles which hinder the social participation of marginalised cultural groups within Europe; and (3) support for the promotion and maintenance of cultures that generate health behaviour. It would appear that Mitchel Weiss has been guiding the development of the nascent field of cultural epidemiology along these principles by providing a culturally valid descriptive and analytic account of the burden and nature of illness. Operating from the Swiss Tropical Institute (STI) in Basel, Switzerland, this research makes use of a framework that orients development of locally adapted EMIC interviews (acronym for Explanatory Model Interview Catalogue). The framework embodied in the EMIC informs an approach to research and assessment for culturally sensitive clinical care, which is being used for studies of both mental health problems and tropical diseases.

The foregoing discussion has suggested the manner in which the encounter between Ayurveda and biomedicine can be made dialogical, which will allow thinking *with* instead of *at* the other. Having chosen one's

other properly and gotten the other straight, modern medicine and Ayurveda can bear witness to both a transcendence and a transformation that would take place not in itself or even in the other but *in between the two*, in a continuous departure from sterile certainty. Ideally, such a witnessing should go both ways, with proponents of modern medicine and Ayurveda "thinking through each other." To be sure, such thinking through each other has not yet happened, at least on any large scale. Indeed, misunderstanding and outright hostility have been much more common, on both sides. Yet, there is hope!

Bibliography

Bagchi, Asoke K., *Medicine in Medieval India: 11th to 18th centuries*. Delhi, Konark Publishers, 1997.

Carakasamhitā: Agniveśa's Treatise Refined and Annotated by Caraka and redacted by Dṛḍhabala, text edited with English translation by P. V. Sharma, 4 vols, Varanasi, Chaukhambha, 1994, 1995.

Chattopadhyaya, Debiprasad, *Science and Society in Ancient India*, Calcutta, Research India Publications, 1977

Chopra, Deepak, *Quantum Healing: Exploring the Frontiers of Mind/Body Medicine*, New York, Bantam Books 1989.

Good, Byron J., *Medicine, rationality, and experience: An anthropological perspective*, Cambridge, University Press, 1994

Eisenberg, David M. *et al.*, *Trends in Alternative Medicine Use in the United States 1990-1997: Results of a Follow-up National Survey*. The Journal of the American Medical Association, vol. 280 (Nov.11, 1998): 1569-75.

Fish, Jefferson M., *Cross-cultural Commonalities in Therapy and Healing: Theoretical Issues and Psychological and Sociocultural Principles*. in Uwe Gielen *et al*, *Handbook of Culture, Therapy, and Healing*, Mahwah, N.J.: Lawrence Erlbaum Associates, 2004, pp. 67-81

Fields, Gregory P., *Religious Therapeutics: Body and Health in Yoga, Ayurveda, and Tantra*, Albany, State University of New York Press, 2001

Fontanarosa, Phil B. and George D. Lundberg, editorial, "Alternative Medicine Meets Science ". *Journal of the American Medical Academy* vol. 280 no 18, November 11, 1998.

Headland, Thomas N. *et al*, *Emics and Ethics: The Insider/Outsider Debate*. Newbury Park, Sage Publications, 1990.

Jonas, Wayne B., *Alternative Medicine--Learning From the Past, Examining the Present, Advancing to the Future*. The Journal of the American Medical Association 280 (Nov.11, 1998): 1616-18.

Kakar, Sudhir, *Shamans, Mystics, and Doctors*, Bombay, Oxford University Press, 1982.

Kearney, Richard, "Between Tradition and Utopia: The hermeneutical problem of myth" in *On Paul Ricoeur: Narrative and Interpretation* edited by David Wood, London and New York, Routledge, 1991, pp 55-73

Krippner, Stanley, *Shamans as Healers and psychotherapists*. in Besette, Luc, *Healing: Beyond Suffering or Death*. Montreal, MNH Publications, 1994, pp. 126-41.

Kumar, Anil. *Medicine and the Raj: British Medical Policy in India 1835-1911*, New Delhi, Altamira Press, 1998.

Leder, Drew, *The Absent Body*, Chicago and London, University of Chicago Press, 1990.

Lupton, Deborah, *Medicine as Culture: Illness, Disease, and the Body in Western Societies*. London, Sage Publications, 1994.

Meulenbeld, Jan "Introduction" in *Proceedings of the International Workshop on Priorities in the Study of Indian Medicine*, edited by G. Jan Meulenbeld, Groningen, Institute of Indian Studies, 1984.

Moerman, Daniel, "Physiology and Symbols: The Anthropological Implications of the Placebo Effect" In *The Anthropology of Medicine: From Culture to Method*, edited by Lola Romanucci-Ross *et al.* Westport, Conn, Bergin & Garvey, 1997, pp.240-253

Nandy, Ashis (with Shiv Visvanathan), "Modern Medicine and its Nonmodern Critics: A Study in Discourse, " in *The Savage Freud and Other Essays on Possible and Retrievable Selves* by Ashis Nandy, Delhi, Oxford University Press, 1998.

Nichter, Mark and Mimi Nichter, "Education by Appropriate Analogy" In *Anthropology and International Health: Asian Case Studies*, Amsterdam, Overseas Publishers Association, 1996, pp. 401-426

Pellegrino, Edmund D and David C. Thomasma, *A Philosophical Basis of Medical Practice: Toward a Philosophy and Ethic of the Healing Professions*, New York, Oxford University Press, 1981.

Pflug, Bernd, *Education in Ayurveda: A Re-constructional Analysis*, New Delhi, Gian Publishing House, 1992

Rao, Mohan, ed. *Disinvesting in Health: The World Bank's Prescriptions for Health*, New Delhi, Sage Publications, 1999.

Romanucci-Ross, Lola, ed. *The Anthropology of Medicine: From Culture to Method*, 3rd ed. Westport, Conn, Bergin and Garvey, 1997

Sharma, Pandit Shiv, ed. *Realms of Ayurveda: Scientific Excursions by Nineteen Scholars*, New Delhi, Arnold Heineman, 1979

Shweder, Richard A. *Thinking through Cultures: Expeditions in Clinical Psychology*, Cambridge, Mass, Harvard University Press, 1991.

Tilak, Shrinivas, *Religion and aging in the Indian tradition*. Albany, N.Y., State University of New York Press, 1989.

Tilak, Shrinivas, *Healing powers of Prāṇa in yoga and āyurveda: a cross-cultural perspective*. in Pesek, Todd *et al.*, *Healing Traditions of India*. Thiruvanthapuram, Olive Publications, 2007.

van der Veen, Klaas W. "Classification and pluralism in medical systems" In *Proceedings of the International Workshop on Priorities in the Study of Indian Medicine*, edited by G. Jan Meulenbeld, Groningen, Institute of Indian Studies, 1984, pp. 345-377

Zimmermann, Francis. *The Jungle and the Aroma of Meats: An Ecological Theme in Hindu Medicine*. Berkeley, University of California Press, 1987.

OPPORTUNITIES AND LIMITATIONS IN GLOBALISING AYURVEDA

R. Kumar

Jawaharlal Nehru Centre for Advanced Scientific Research
Bangalore

Introduction

Traditional systems of medicine, evolved over the ages, had been completely looking after the health care of the world until the advent of allopathic system of medicine. As this system used the knowledge of modern biology and chemistry, for both discovery and treatment, it found fast acceptability and now occupies significant space in the area of health care. In surgery, it has virtually replaced the traditional systems. In spite of this, the contribution of the traditional systems of medicine to health-care continues to be enormous. The acceptability of their preparations, which normally are poly-herbal, is increasing because of the general impression that these products are benign. The single molecule based drugs used by the allopathic system can have severe adverse effects. Hence, there is a steady emergence of preference for herbal preparations, particularly if they are as effective as single molecules. Ayurveda not only uses poly-herbal preparations but has proved to be very effective against many diseases, particularly degenerative ones.

In India, most people consider ayurvedic treatment to be the treatment of last resort, particularly for degenerative and other long standing complex disorders. Most of the patients treated in highly respected ayurvedic hospitals are those who have exhausted treatment offered by the modern system. In most cases, the benefits to the patient are positive, while in some cases the recovery can be spectacular. It is quite clear that for a variety of conditions of sickness, ayurvedic treatment is highly effective. This system of medicine is at present confined primarily to India, whereas its effectiveness is such that it can play a wider beneficial role for health care internationally. Thus, there is a clear potential for globalising this

system. It is interesting to speculate on the prerequisites, strategies, limitations and other implications of globalising Ayurveda.

1. Implications of Globalising Ayurveda

Though quite vibrant and expanding in India, Ayurveda has hardly any presence elsewhere, particularly in the west. Ayurveda has a distinct philosophy on the basis of which the sickness, its reasons and methods of treatment are described. The core of Ayurveda is in the concept of *doṣas*, description of disease as an imbalance of *doṣas* and treatment based on the inherent constitution of an individual. Involved in the treatment are special practices like guidance on food, detoxification, etc. It also has a large number of commercially available products, which are commonly used by its practitioners.

Globalisation of Ayurveda can be considered at various levels.

1. Globalisation of total Ayurveda consisting of its philosophy, practices, and products all taken together as a single entity.
2. The practices of Ayurveda which include special therapies like detoxification, combo-therapy, functional foods, etc., may be incorporated while giving treatment through other systems of medicine. These practices have arisen out of ayurvedic philosophy but have scope of being integrated in the modern system.
3. Innumerable products of Ayurveda, existing as well as newly designed ones may be made available in such a form that they are acceptable to other systems.
4. New concepts arising out of ayurvedic products, for example bio-enhancing, synergism, etc., may be incorporated in other systems too quite easily.
5. Through global interactions, Ayurveda itself may undergo such changes which do not modify its core profile, but make it more compatible with other systems for understanding, appreciation and use.

However, up to now, Ayurveda has remained confined to India. Even its traditional preparations do not enjoy significant use in the west, when compared to the Chinese preparations. There are hardly any ayurvedic practitioners in the rest of the world, nor do many Indians settled in various countries use its products for therapeutic purposes. These conditions make it difficult for Ayurveda to be globalised. There are a minimum of four requirements for successful globalisation. These are: (i) the users should have some knowledge of the system, (ii) they should be convinced enough to have faith in the system, (iii) there should be practitioners who can use the system or its practices as well as products, and (iv) its products should be easily available for use without the need for each individual practitioner to formulate them.

Each component of Ayurveda, viz. ayurvedic philosophy, ayurvedic practices, special phenomena derived from Ayurveda and preparations designed through the use of ayurvedic principles need to be considered individually as well as together for potential globalisation.

2. Globalisation of Ayurvedic Philosophy

If the treatment is patient-centric instead of system centric, then ayurvedic treatment could well be the most suitable choice for some clinical conditions. However, the practitioner must have enough knowledge of Ayurveda to be able to suggest its use.

At present, it is not likely as detailed knowledge of Ayurveda is available primarily in India where it is practised. For it to be generally acceptable elsewhere (by those who do not have traditional exposure to it), it needs to not only be expressed through a language which others can understand but also shown to be effective and safe for conditions of sickness for which it is most suitable.

Firstly there is need to have at least an approximate equivalence between a condition of sickness diagnosed through the modern system and as expressed through ayurvedic principles. This has necessarily to be done at a gross level because Ayurveda does not look at a condition from a molecular view point. It is interesting that increasing number of ayurvedic

practitioners are aware of the modern diagnostic tools and use them apart from examining the patient through their own techniques. Further many a time, a patient tries ayurvedic treatment after having been unsuccessfully treated by allopathic physicians. Such patients bring with them detailed reports of various diagnostic tests already performed. To understand and benefit from the reports, many ayurvedic practitioners become quite conversant with the modern diagnostic tools. If this trend continues, it is possible that in due course, ayurvedic practitioners may be able to partly express their findings in the language of modern diagnostics. Any progress in defining equivalence between expressions used by ayurvedic and the modern system of medicine for various diseases, will improve communication and therefore dialogue. It will also help in comparing performance of various systems of medicine at a clinical level, because it will ensure that treatments are being compared for the same conditions of sickness.

Though Ayurveda treats large number of patients for diseases of various degrees of complexity, the clinical results are seldom presented in a fashion which establishes its efficacy and makes comparisons easy. However, this very important aspect can be easily achieved through interactions of allopathic and ayurvedic experts and recording data on acceptable formats. Results of a large number of such investigations are sure to bring out the range of diseases in which Ayurveda excels over other systems. They will also bring out the limitations in respect to the diseases (like bacterial) in which other systems of medicine offer better treatments. Investigations of these kinds can also test the notion of individual based treatment practised by Ayurveda. However, such efforts, may take a long time. Nevertheless, it is necessary to pursue them with rigour.

There is another method of making specialised ayurvedic treatment available in various countries for diseases which are intractable and degenerative, and in which ayurvedic has proven strengths. This is by establishing ayurvedic hospitals in various countries (which permit such setups) by well known ayurvedic establishments of India. Such hospitals may be manned by practitioners belonging to the parent organisations. If they turn out to be as successful as they have proven to be in India, they can

not only make the much needed contribution to health care, but also establish its acceptance by the public. There is likelihood that experts from other systems may then want to know more about this system of medicine. Some interest has already been shown by US, UK, and South Africa to provide their practitioners some exposure to Ayurveda. They have asked India to provide them with *curricula* on Ayurveda. Similarly, National Institute of Health (USA) plans to send a team of scientists to India to identify areas of collaborative research in Ayurveda.

All this will help in the acceptance of Ayurveda. However, the treatment of degenerative diseases, in which Ayurveda excels, can be given only by expert ayurvedic practitioners, who have imbibed the traditional wisdom. Thus the acceptance and use of ayurvedic philosophy internationally may be very slow and will strongly depend on the clinical evidence provided by a large number of investigations for various diseases. Setting of ayurvedic hospitals is likely to help. So will the exposure of ayurvedic principles to the practitioners outside India.

However, apart from ayurvedic philosophy, there are ayurvedic practices and products. Some of them can be considered independently of the ayurvedic philosophy, as far as globalisation is concerned.

3. Ayurvedic Practices

Ayurvedic treatment involves a number of special practices which have arisen out of ayurvedic philosophy but which lend themselves to be used independently too. However, they have to be first tested rigorously to prove their efficacy. The first of these practices is the food regimen to be followed by a patient. There are some food guidelines for a few diseases in Allopathic system too, but it is very important in ayurvedic treatment as different foods have different effects on various *doṣas*. In fact, there are special food guidelines to remain healthy too. A systematic investigation is required to assess the influence of food regimen on the rate of recovery and in some cases even the extent of recovery. If it is proved that food regimen has statistically significant influence on drug efficacy, the practice may be introduced in other systems of medicine too. It can then result in a

commercial opportunity in the food market for "ayurvedic functional foods".

One of the important ayurvedic practices involves detoxification through procedures called *pañcakarmas*. Though elaborate detoxification procedures can be performed only by expert practitioners, the simpler one involving gastric tract and skin can be practised relatively more easily. It is possible that use of detoxification procedures may become acceptable in future for both treatment of diseases and maintenance of good health. Russia has recently accepted *pañcakarma* as a legitimate therapy and is obtaining expertise on it from India. However, to make them acceptable on a wider scale, serious scientific investigations are necessary to assess the efficacy of *pañcakarma* during the treatment of various diseases.

The third practice of Ayurveda involves the use of rejuvenators and toners through special (normally poly-herbal) preparations. Along with these are special practices which further assist recovery. The use of these concepts of recovery and rejuvenation along with treatment through other systems (for example Allopathic) can accelerate the recovery of patients in diseases where normal recovery is slow (say after a stroke). Of special interest in this category of combo-therapy can be the mop-up treatments based on immuno-stimulation through ayurvedic methods. For example, the disease may be treated primarily through Allopathic method, but the final clean up (in the case of cancer, for example) may be done through the use of ayurvedic therapy. As with the other ayurvedic practices, this too should be investigated in detail and if found effective, incorporated in combo-therapy.

A major component of ayurvedic system is emphasis on maintaining good health by regular detoxification, rejuvenation, special exercises, and control over food habits. The regimen on most of these has to be decided on the basis of constitution of the individual. It is quite plausible to set up ayurvedic health clubs in the Western countries where guidance through practice can be provided. This can enhance the acceptability of Ayurveda as a whole. Simple books on 'Ayurveda for the healthy' containing guidelines should be published in as many languages as possible.

4. A New Concept from Ayurvedic Practices

From the practice in Ayurveda of adding *trikatu* (a mixture of black pepper, long pepper and ginger) to many formulations has resulted the notion of a "bio-enhancer", which improves the bio-availability and bio-efficacy of a drug without itself acting as a drug. Piperine has already been shown to be a bio-enhancer for rifampicin during the treatment of tuberculosis. The concept developed by Regional Research Laboratory, Jammu, based on ayurvedic practices, can be easily assimilated by not only Allopathic system but also by other traditional systems of medicine. Search for bio-enhancers working in different ways from ayurvedic preparations needs international attention, research effort and eventual use.

5. Ayurvedic Products

The part of Ayurveda which lends itself most readily to globalisation is its products. About a thousand of these products are already commercially available and new ones can be designed through the use of principles of Ayurveda. Internationally, there is an increasing acceptance of herbals as therapeutic agents, to be used by Allopathic practitioners. Even FDA has modified its guidelines, and is now treating herbal products at par with single molecules, provided they have been tested according to acceptable protocols and through clinical trials. Herbals have already started attracting attention from some of those companies which hitherto were manufacturing only single molecules. Ayurvedic preparations have a natural edge as its designers have a much greater feel for herbal preparations involving many herbs and their interplay. There is a great likelihood of many new optimised herbal preparations, incorporating synergism and bio-enhancing, but using fractions instead of whole extracts. Special preparation like *bhasmas* may be accepted internationally, after they have been shown to be effective and safe for specific diseases.

As these preparations would have been tested *in vitro* as well as *in vivo*, they would be acceptable to the Allopathic system. Many new

preparations will also become available to ayurvedic practitioners who can interpret them according to the theory of *doṣas*. *In vivo* tests would prove safety and efficacy and the results obtained during clinical trials can provide an opportunity of correlating *in vivo* tests with the modification of *doṣas* in humans. Thus, these protocols will permit Ayurveda to try hitherto untried plant materials, without the risk of toxicity to humans and successfully generate new products for various conditions of sickness. A major advantage of the new products will be that they will result in 'intellectual property rights' which can be protected.

Conclusions

An ideal treatment should be patient-centric rather than system centric. In such a treatment, a patient would receive treatment from that system of medicine which is most suitable for that disease. Ayurveda is very effective against old age related degenerative diseases and hence should find enormous use. However, it is unlikely to happen as ayurvedic philosophy and associated practices are not known to practitioners of other systems of medicine.

Though some countries are trying to make their doctors aware of Ayurveda, it will be advantageous to set up specialised ayurvedic hospitals in the West which will not only cure diseases but also generate acceptability for it. For improving the quality of life, ayurvedic health clubs can serve various communities as well as improve acceptability. To improve communication among experts, efforts are needed to generate equivalence for a disease between the ayurvedic description and results obtained through modern diagnostics. Further, there is need to collect clinical data and present it in a form acceptable to other systems, which would show the efficacy of ayurvedic treatment for various diseases.

However, these can only be long term goals and are unlikely to be achieved in the immediate future, even though some countries have started showing interest in Ayurveda. Much more likely to be accepted are special practices of Ayurveda, like detoxification through *pañcakarmas*, combination therapy in which ayurvedic practices can enhance the rate of recovery or

mop up the residual disease, use of functional foods, and procedures to improve quality of life specially for the aged. All these however will require investigations to ensure that these practices are indeed effective. Areas where positive results are obtained can give rise to interesting topics for basic research. Ayurvedic products, which are now available off the shelf, can be used by other systems after they have been tested through protocols pertinent to that system. New products which worked through synergism would find easy acceptance provided they are tested rigorously at *in vitro* and *in vivo* levels, followed by clinical trials. Bio-enhancers, originating from ayurvedic practices, are likely to find increasing use in designing more effective and less toxic formulations (with herbals and single molecules).

Thus, the products of Ayurveda offer an opportunity of globalisation followed by some of Ayurveda practices. Treatment based on ayurvedic philosophy is unlikely to become common in the near future (though preliminary interest has been shown by some countries). However, a beginning in this direction can still be made through starting special ayurvedic hospitals and starting health clubs to improve quality of health.

PARTICIPANTS

M. S. Valiathan holds the degree of MBBS from the Kerala University; Master of Surgery from the University of Liverpool, UK; and Fellowships of the Royal College of Surgeons of England and the Royal College of Physicians and Surgeons of Canada. He served as Professor of Cardiac Surgery in the Sree Chitra Tirunal Institute, Trivandrum, and as the first Vice-Chancellor of the Manipal University. He is currently a National Research Professor of the Government of India.

Professor Valiathan is the author of a monograph in cardiology and over ninety papers on cardiovascular topics. His studies on the classics of Ayurveda have resulted in the publication of *The Legacy of Caraka* (2003), *The Legacy of Suśruta* (2007) by Orient Longman and *The Legacy of Vāgbhaṭa* (2009), by Orient Blackswan.

Email: msvaliathan@gmail.com

Charles Malamoud was Directeur d'études (professor) at the Ecole pratique des hautes études (Sorbonne), Paris, until his retirement in 1998. His field is Vedic literature and ritual. *Féminité de la parole dans l'Inde ancienne* (Albin Michel, 2005), *La danse des pierres : Etudes sur la scène sacrificielle dans l'Inde ancienne* (Seuil, 2005), *Le Jumeau solaire* (Seuil, 2002), *Cuire le monde* (La Découverte, 1989), *La dette* (Ehess, 1988), are some of his major works.

Email: Charles.MALAMOUD@refer.org

K. Raghunathan is on the Scientific Advisory Council on Traditional Medicine, the Advisory Council of Center for Advanced Research on standardisation, quality control and formulation of Traditional Remedies/Natural Products of Regional Research Laboratory, Jammu, and member of the Scientific Advisory Group to the Division of Basic Medical Sciences of Indian Council of Medical Research.

Dr. Raghunathan is author of a dozen books/monographs on a variety of subjects that include Ayurveda, experimental medicine, drug

standardisation, protocols for International acceptance of ayurvedic Formulations and GMP, medical historiography, etc. He has published over one hundred papers of scientific nature.

Email: jindal_ak@yahoo.com

Dominik Wujastyk holds degrees in Physics and Sanskrit, and a doctorate in Sanskrit from Oxford University. He works at London University as a Wellcome Trust Senior Research Fellow at the Wellcome Trust Centre for the History of Medicine at UCL. He has taught Sanskrit language and literature, and the history of Indian medicine. His interests include the history of Indian medicine and science, the history of Sanskrit grammar, and the study and preservation of Sanskrit manuscripts. His current research focuses on the social and intellectual history of medical practice in India on the eve of colonialism, 1550-1750. Dr Wujastyk's authored books include *A Handlist of Sanskrit and Prakrit Manuscripts* (1985, 1998), *Metarules of Paninian Grammar* (1993), *Critical Edition Typesetting* (1996, with John Lavagnino), and *The Roots of Ayurveda: Selections from Sanskrit Medical Writings* (2nd ed. 2001).

Email: d.wujastyk@ucl.ac.uk

Timothy Walker (M.A., Ph.D., Boston University, 2001) is assistant professor of history at the University of Massachusetts Dartmouth, and a visiting professor at the Universidade Aberta in Lisbon, Portugal. Teaching fields include Early Modern Europe, the Atlantic World, the Portuguese and their empire, maritime history and European global colonial expansion. Current research topics focus on the 17th and 18th centuries and the adoption of colonial indigenous medicines by European science during the Enlightenment, slave trading in the Atlantic and Indian Oceans, as well as commercial and cultural links between the Portuguese overseas colonies in Asia, Africa and the Americas.

Email: tdwalker2001@yahoo.com

P. M. Varier holds degrees of Bachelor of Ayurvedic Medicine (B.A.M.), Kerala University and Doctor of Medicine (Ayurveda) M.D. He is Superintendent of the Ayurvedic Hospital and Research Centre, Arya Vaidya Sala, Kottakkal, Kerala and Dean, Faculty of Ayurveda, University of Calicut.

He is an active member of the group working on bioactive molecules from medicinal plants set up jointly by Council of Scientific and Industrial Research (CSIR) and Arya Vaidya Sala, Kottakkal. Dr. Varier is a member of the Ayurvedic Pharmacopocia Committee of the Government of India and of the Scientific Advisory Committee of the Gujarat Ayurved University.

Email: mvarier@aryavaidyasala.com

Kedar Shende graduated as Ayurvedacharya (B.A.M.S.) from University of Pune in 1996. He is Fellow of the Institute of Indian Medicine co-author of a book on ayurvedic classics attributed to Caraka, Suśruta and Vagbhata. He has been delivering lectures and teaching Ayurveda in and out of India. Dr. Shende has an independent ayurvedic practice in Pune and Goa where he applies the *pañcabhautika* methodology rather than the more commonly used *tridoṣaja* methodology. With more than 12 years of purely ayurvedic practice behind him, he now focuses on clinical research in ailments like *pramcha*, cancer, cardiac disease and hepatic diseases. Dr. Shende has rather orthodox views on Ayurveda and is presently studying the possible compromises being made in Ayurvedic education and practice in the course of its globalization. Dr. Shende aims at starting an ayurvedic school according to ancient *gurukula* tradition.

Email: ayurvedacharya@gmail.com

Unnikrishnan Payyappallimana graduated in Ayurvedic medicine from the Ayurveda College, Coimbatore (Bharathiyar University) South India. He also holds a Master's degree in Medical Anthropology from the University of Amsterdam, the Netherlands. He was research fellow at the Amla Cancer

Hospital and Research Centre, Kerala. Since 1995, he has been working with an NGO (Foundation for Revitalization of Local Health Traditions, Bangalore) in India, focusing on traditional medicine and sustainable health care. He has served as a Research Fellow (1998) and later as a Visiting Associate Professor (2003) at the Toyama Medical and Pharmaceutical University, Japan. Currently, he is doing his Ph.D at the Yokohama National University, Japan, in International Development Studies and his research interests are integration of traditional medicine in public health, medical pluralism and endogenous development.

Email: unnipm@yahoo.com or unni.pm@friht.org

R. Kumar is Hindustan Lever Research Professor at Jawarharlal Nehru Centre for Advanced Scientific Research, Bangalore. Professor Kumar has been involved in devising strategies to globalise various preparations formulated on the basis of Ayurveda. He is the chairman of a major R&D effort to search for new or modified bio-active entities as therapeutic or pest management agents from plant and other natural sources. This programme networks the facilities and expertise of about forty laboratories and involves collaborating with organisations engaged in the practice of traditional systems of medicine and manufacture of products based on them. Professor Kumar is also a fellow of the Indian National Science Academy, Indian Academy of Sciences, and Indian National Academy of Engineering.

Email: kumar@chemeng.iisc.ernet.in

Kenneth G. Zysk is associate professor and head of the department of Indology at Copenhagen University. He received his D. Phil. from the University of Oslo and Ph.D. from the Australian National University. He has been Senior Fulbright Fellow to India, and a Wellcome Fellow in the History of Medicine in London, Directeur d'Études Associé, École Pratique des Hautes Études, Paris, and Elisabet de Boer Senior Fellow, Université de Lausanne.

In addition to having written three books and numerous articles on themes pertaining to the history and practice of Indian medicine and Ayurveda, both inside and outside of India, he has served as consultant on several projects on alternative or complementary medicine and is the co-editor of a series on Traditional Indian Medicine with Motilal Banarsidass, and managing editor of the Critical Pali Dictionary at the University of Copenhagen. He currently works with a Japanese colleague for the edition and translation of Jajjata's commentary on the *Caraka Saṃhitā* and is compiling a book on the history of physiognomy and physiognomic literature in India.

Email: zysk@hum.ku.dk

Mário Simões is professor of Psychiatry at the Faculty of Medicine of Lisbon and private psychiatrist. He holds a degree in Anthropology. Interested in Scientific Parapsychology and Alternative and Complimentary Medicine, he currently conducts research on Altered States of Consciousness.

Email: noonauta@gmail.com

Shrinivas Tilak has taught at several Canadian universities including Concordia University in Montreal. Holder of a doctorate in history of religions from McGill University, Montreal, he is author of *The Myth of Sarvodaya: A Study in Vinoba's Concept*, (Breakthrough, New Delhi, 1985), *Religion and Aging in the Indian Tradition* (SUNY, Albany, N.Y. 1989), and *Understanding Karma: In Light of Paul Ricoeur's Philosophical Anthropology and Hermeneutics* (BookSurge, Charleston, SC. 2007). Dr. Tilak's other research interests include Ayurveda, social gerontology, and cultural hermeneutics.

Email: shrinivas.tilak@gmail.com

A. Salema holds degrees in Philosophy, Indian Studies (Sanskrit) and Religious Anthropology. Doctorate at Sorbonne with the study *Anthropologie du corps: savoirs, pratiques et expériences. Enquête sur la psychagogie ayurvédique*. Several years of research as fellow of the Portuguese FCT lead to the forthcoming publication *The medical experience of the body in India. From the learned ayurvedic orthodoxies to the healing heteropraxies*.

Her current research concern moves through the intangible healing practices (psychagogic procedures in ritual and ayurveda, psychoimmunology), the role of *karman* in the Indian ecology of Fate and the epistemological issues of ethnographic work and ethnological representations. The research in progress focuses on the *nadijyotisha* devices for healing a ill-fate.

Email: salemana@rediffmail.com

INDEX

- acintya* 6, 198
agni 117, 122, 125, 129,
132-135, 144-146, 153, 179,
201, 202, 213
Agniveśa Tantra 19, 20
allopathic system 10, 168-169,
227, 234, 265, 268-271
aloe 42, 87
alternative medicine 236, 246
Amarakośa 126
apasmāra 21
Aruṇadatta 121, 125, 137, 138
ārvore-triste 42
asafoetida 88
Aṣṭāṅgahṛdaya 126, 138, 182-
183
Aṣṭāṅgasamgraha 126, 179, 181,
184
Atharvaveda 18, 55, 105, 106
asthi 135, 136, 139, 142, 144
atipralāpa 194
ayurpathic 234
ayurveda
origins 18, 105, 106, 115, 250
ayurvedic education 10, 14, 209,
220
ayurvedic *materia medica* 13,
107, 210, 214, 215
ayurvedic philosophy 109, 173,
265, 267, 269-273
ayurvedic practices 7, 9, 15, 91,
173, 177, 267, 269-273
ayurvedic practitioners 167, 172,
246, 267-269, 272
ayurvedic preparations 167, 171,
173, 175, 176, 234
ayurvedic principles 90, 105,
172, 208, 209, 213, 267-271
ayurvedic texts 3, 76, 140, 194,
234, 247, 253
basonyms 164
belas 35
benefit sharing 212
benzoin 94
bezoar stone 33, 34, 42
bhaṅgā 49, 56, 57, 62, 70
Bhāvamiśra 40, 159, 218

- Bhāvaprakāśa** 159, 163, 218
bhaya 121, 126, 128, 129, 131
Bhoja 117
Brhatrayi 42, 156, 163
bhrājakapitta 121, 122, 125
bhūta 4, 7, 110, 118, 132, 134, 140-144, 146-149, 151-154, 197-201
 bioenhancers 174, 177
 biomedicine 13, 208, 210, 230, 234, 241, 246, 254, 256
 black pepper 53, 173, 191, 271
 body fluids 152, 180
 bridging research 8, 10, 206, 216
buddhi 126-128, 130-131, 146, 148-149
Cakrapāṇi 57-58, 117, 123, 124, 126, 138, 159, 239
Cakrapāṇidatta 124, 159, 239
canafistula 39
cannabis 45-71
 morphology 56, 62
 properties 45, 48, 52, 59, 61, 62, 64
 amongst *sādhus* 60
 clinical experiments 53
 recipes 57, 60
Carakasamhitā 4, 19-23, 29, 41, 105, 107, 113, 117, 126, 127, 137-138, 159, 163, 164, 166, 179, 180, 188-189, 211-212, 223, 238, 249-251, 261, 274, 278
 cardamom 90
 cashew 89
chopchini 40
cikitsā 116, 140, 151, 154, 199, 200, 214
 cinnamon 41, 89, 91, 94, 231
 classical literature 14, 156, 158, 161, 163, 165, 209
 clinical practice 15, 165, 242
 cloves 90
 collaborative research 216, 269
Colloquies on the Simples ... 32-33, 41, 48-49, 71, 98, 273
 colocynth 90
 colonial medicine 234
 combotherapy 175, 177
 controversial identities 14, 210
cūrṇa 63, 176
Ḍalhaṇa 119, 125, 126, 129, 138
darśana 120, 123, 196
 database operations 163
 datura 35, 36
 degenerative diseases 178, 179, 180, 181, 187, 264, 267
 detoxifiers 177
Dhanvantari 58, 59, 72, 140, 159, 163
Dhanvantariyanighaṇṭu 58, 72, 162
dharma 24, 26, 126, 250-252
dhātu 6, 114, 135-145, 152, 153, 179, 181, 197, 202
 digestive fire 59, 180, 183

dīkṣā 10
doṣa 4, 5, 6, 7, 35, 118, 131, 135-137, 140-145, 150, 154, 185, 190, 193, 194, 197, 202, 218, 221, 224, 266, 269, 272
drava 132, 144, 149, 151
dravya 148-151, 154, 198-202, 211
dravyagūṇa 159, 222
Dr̥ḥabala 19, 20, 137, 257
 emic/etic perspective 236
 epidemiology 10, 20-23, 80, 84, 93, 260
 epistemological paradigm 2

galanga 33
gañjā 52, 58, 61, 62
Garcia de Orta 31-44, 48-50, 52, 55, 67, 71, 77, 89, 91, 98, 231
 and the "Hellenists" 41
 humoral pathology 32
ghrāṇa 152, 153
 ginger 41, 88, 90, 162, 173, 191, 271
 globalisation 12, 171, 204, 259, 266-267, 269-271, 273, 276
 Goa Medical and Surgical School 81
guaiaco 38
guṇa 4, 5, 28, 72, 131, 144, 148, 149-153, 163, 198-201, 211
guru 10, 28, 140, 141, 149, 153, 200, 203, 220, 224

guru/siṣya 10
gurukula 7, 10, 13, 276
 healer 16, 75, 76, 191, 245
 health care 18, 76, 77, 80, 83, 105, 106, 115, 165, 167, 177, 213, 247, 255, 257-8, 265, 269
 hemp 48, 51-56, 69, 70, 71, 73
 herbal preparations 10, 168, 174, 194, 239, 265, 271
hṛdaya 119, 126, 127-130
 humoral pathology 32
 humours 32, 61, 87, 190, 225, 251
 hybrid medical culture 75, 82

 image 2, 7, 24, 123, 124, 192, 240, 256
 immunomodulatory effect 173
 indigenous healers 78, 79, 85
 indigenous medical knowledge 76, 82-84, 89, 95, 231
indriya 127, 131, 147, 148, 149, 150, 151

kapha 35, 114, 116, 118, 126, 129-133, 140, 142-143, 150, 152, 154, 190, 202
karman 147, 148, 211, 226, 239
kaśāya 200
Kāśyapa 119, 137
kaṭu 119, 121, 133, 134
kāya cikitsā 116, 122
khara 149, 151, 153

- knowledge systems 11, 206, 232
kutakī 152
- laghu* 150, 151, 200
lavaṇa 121, 200, 212
 living system 5, 8, 105
- madhura* 133-134, 199-202
madhura rasa 200-202
majjā 123, 135, 136, 139, 142
mala 135, 139, 141, 142, 196
 mallow 88
manas 6, 124, 126-131, 135, 147-150, 153, 199
marman 152
Marmelo-de-bengala (also *cirifoles, belas, belī*) 35
materia medica 1, 33, 51, 65, 106, 112, 203, 231
mātulānī 59
medas 123, 135, 136, 142
 medical anthropology 234, 235
 medical ethics 11, 28, 30
 medical metalanguage 2
 medical traditions 49, 83, 155, 218, 225, 236
 medicinal plants 10, 23, 31-32, 76, 86, 93, 94, 155, 160, 163, 165, 207, 210, 276
 medicine and power 29
 mental disorders 22, 36, 189, 190
 modern medicine 11, 24, 30, 36, 141, 178, 216, 229-231, 235-241, 243, 245, 246, 251-256
- modern science 6, 16, 204, 240
mṛḍu 149, 151, 202
mūtra 142, 154, 196, 197
 myrobalans 41
- nāḍī* 141, 196, 221
 neuromodulators 192
 New Age Ayurveda 218, 224-228
- Nicolás Monardes** 31, 43, 44, 67
nīdāna 140, 196, 209, 213-214, 226
nīdrā 59, 128-130
nighaṇṭu 159-161, 163
 nomenclature correlation 156, 158, 163, 165
Nyāya 19, 111
- oil massage 185, 194
ojas 120, 132, 139, 213
 opium 46, 49, 57, 67, 69, 91, 94
pāñcabhautika constitution 198, 200
pañcakarma 165, 174, 265
pāṇḍu 13, 22, 123, 208, 209
parīkṣaṇa 141, 196
 pathophysiology 190
 pepper 33, 34, 53, 91, 173, 191, 271
Pharmacopea Lusitana Aumentada 87
Pharmacopocia Indica 51
 physician (also, *vaidya bhiśak cikitsaka* (Skt.), *fīsico-mor,*

médico (Port.)) 5, 6, 11, 19,
 24-30, 32, 48, 74-76, 81, 84,
 219, 221, 227, 238, 242, 245,
 249, 250
piṇḍa 186, 197
picchīla 149, 150
pippalī 157, 162, 212
pitta 22, 35, 114-126, 132-139,
 142-144, 150-151, 154, 179,
 190, 193, 197, 199, 201
 plant databases 155
 polynomial nomenclature 157
 multiple botanical species
 157, 210
prabhāva 59, 162, 198, 199
prajñāparādha 7, 226
prakṛti 26, 152, 153, 214, 221
 protocols 9, 12, 168, 171,
 177, 266-269
Punarvasu Ātreya 123
rajas 6, 109, 152
rakta 13, 22, 122, 123, 135,
 136, 139, 142, 197, 209
rañjakapitta 121, 122
rasa 5, 59, 119, 122, 127, 133-
 136, 139, 142, 147-149, 152,
 162, 197-203
rasāyana 64, 178, 183, 184n.
 research protocols 208, 209, 214
 rhubarb 92
roga 22, 40, 142
rūkṣa 150, 151, 201, 202

sādhakapitta 12, 121-122,
 126, 128-132
sāmānya 5, 144, 151, 200
sāmānya viśeṣa siddhānta 200
Sāṃkhya 111, 113, 115, 148
samsāra 6
 sandalwood 74, 92
sara 119, 132, 144, 149, 199
sarpagandha 36, 203, 204
 sarsaparilla 92
sattva 6, 109, 213
 schizophrenia 190, 194, 195
 scientific paradigm 246
 sensory organs 109, 110, 112,
 182
Siddha 69, 101, 155, 165, 170,
 175, 176, 233
 single molecules 168, 171, 173,
 175, 265, 271, 273
snehana 178, 182, 183, 185,
 186, 187
snigdha 149, 150, 199, 200
sparsana 119, 196
sthira 149, 153
sthūla 141, 142, 149, 153
 structural units 114, 179, 180,
 181, 183, 187
sūkṣma 141, 142, 150, 151, 202
Suśrutasaṃhitā 106, 109, 110,
 114, 183
sveda 119, 120, 139, 142, 186
svcdana 178, 182, 183, 184,
 186, 187

synergism 12, 171, 172, 177,
261, 266, 271, 273

tamarind 42, 92

tamas 6, 109, 126, 129, 130

tanmātra 147, 148, 153

tejas 118, 120, 132, 134, 144,
147, 148, 150, 151, 153, 154,
199-202

tellfoll 74

tikta 162, 200

traditional systems of medicine
24, 74, 168, 169, 229, 234, 235,
265, 271, 277

trikatu 173, 191, 223

tropical diseases 76, 79, 83, 256

tropical medicine 43, 67

turpeth 39

Unani 155, 165, 170, 218,
233, 235, 253

unmāda 22

Vāgbhaṭa 35, 117, 119, 120,
122, 123, 125, 132, 137, 159,
179, 181, 182, 183, 184, 200,
250

Vaiśeṣika 111, 113, 115

vaidya 5, 6, 24, 25, 196, 220,
221, 238

validating parameters 15

validation 8, 9, 12, 14, 15,
206, 209

vāta 13, 35, 36, 114, 118, 142,
143, 145, 152, 182, 184, 190,
193, 194, 200-204, 207, 208,
209, 213

vāyu 118, 132, 143, 146-148,
151-154, 200-203

Vedānta 111

vijayā 56, 58, 62, 64

Vijayarakṣita 117

vikṛti 199

vipāka 59, 114, 133, 134,
198-200

vīrya 59, 121, 162, 198-200

viśada 149, 153

viśeṣa 5, 144, 145

yoga 8, 59, 61, 72, 111-
112, 188, 198, 211, 215, 221,
225, 250, 253, 261

yukti 6, 211

Zedoary 93

APPENDIX TO INDEX

- Aloevera** 42, 87
[*Aloe vera*, L., Burm. f., Liliaceae]
Aloé, aloés (Portuguese)
gvarpatha, ghikumārī (Hindi)
kumārī (Sanskrit)
- Asafoetida** 88
gum resin from [*Ferula spp.*, L., Umbelliferac, (namely from *F. Foetida* (Bunge) Regel, *F. narthex*, Boiss. and *F. assa-foetida*, L.)]
assafétida (Portuguese)
hing (Hindi)
hingū (Sanskrit)
- Bael tree, stone apple** 35
[*Aegle marmelos*, (L.), Corr. Serr., Rutaceae]
marmelo-de-bengala (Portuguese)
bcl, bela, sirphal (Hindi)
śrīphala (Sanskrit)
- Benzoin** 94
resin from [*Styrax benzoin*, Dryander, Styracaceae]
benjoim (Portuguese)
lubān (Hindi)
kālānusārin (Sanskrit)
- Cardamom** 90
[*Elettaria cardamomum*, (L.), Maton, Zingiberaceae]
cardamomo (Portuguese)
ilaichi, clāchī (Hindi)
clā (Sanskrit)

Cashew	89
[<i>Anacardium occidentale</i> , L., Anacardiaceae]	
<i>caju</i> (Portuguese)	
<i>kaju, dūk</i> (Hindi)	
<i>vrkkaphala, vrkkabīja</i> (Sanskrit)	
Cinnamon	41, 89, 91, 94, 231
[<i>Cinnanomum verum</i> , Presl., Lauraceae]	
<i>canela</i> (Portuguese)	
<i>dalchini</i> (Hindi)	
<i>tvak</i> (Sanskrit)	
Clove	90
[<i>Syzygium aromaticum</i> , (L.), Merr. & Perry, Myrtaceae]	
<i>cravo</i> (Portuguese)	
<i>lavang</i> (Hindi)	
<i>lavaṅga, devakusuma</i> (Sanskrit)	
Colocynth, bitter apple	90
[<i>Citrullus colocynthis</i> , (L.), Schrader, Cucurbitaceae]	
<i>coloquintidas</i> or <i>maçã-coloquintida</i> (Portuguese)	
<i>kaḍu indravana, baḍī indrāyan</i> (Hindi)	
<i>indravallī, viśāla</i> (Sanskrit)	
Datura	35, 36
[<i>Datura spp.</i> , L., Solanaceae]	
<i>datura</i> (Portuguese)	
<i>dhaturā</i> (Hindi)	
<i>dhattūra</i> (Sanskrit)	
Ginger	41, 88, 90, 162, 173, 191, 266
[<i>Zingiber officinale</i> , Roscoe, Zingiberaceae]	
<i>gengibre</i> (Portuguese)	

adrakh, adrak (Hindi)
ādraka, śṅgavera (Sanskrit)

Greater galanga 33

[*Alpinia galanga*, (L.), Sw., Zingiberaceae]
galanga-maior (Portuguese)
kuliñjan (Hindi)
sugandhimulā, sugandhā, ūgragandhā (Sanskrit)

Guaiacum 38

[*Guaiacum officinale*, L., & *Guaiacum sanctum*, L.,
Zygophyllaceae]
Guaiaco (Portuguese)
Chobehyat (Hindi)

Hellebore 152

[*Picrorhiza kurroa*, Royle ex Benth, Scrophulariaceae]
kutki (Hindi)
kutakī, kaṭukā (Sanskrit)

Herb rue 63

[*Ruta graveolens* L., Rutaceae]
arruda (Portuguese)
sadāb, satāri, sudap (Hindi)
gucchapatrā (Sanskrit)

Indian laburnum 39

[*Cassia fistula*, L., Leguminosae]
canafistula (Portuguese)
amaltās (Hindi)
amalataś, āragvadha (Sanskrit)

Indian prickly ash	74
[<i>Zanthoxylum rhetsa</i> , DC, Rutaceae]	
<i>pinheiro-de-joão-lopes</i> , <i>telfolans</i> , <i>pimenta-albarrã</i> (Portuguese)	
<i>tejpāl</i> (Hindi)	
<i>cīraphala</i> , <i>tumbaru</i> (Sanskrit)	
<i>tellfoll</i> , <i>tefoll</i> (Konkani)	
Mallow	88
[<i>Althaea officinalis</i> , L., Malvaceae]	
<i>alteia</i> (Portuguese)	
<i>gulkhairū</i> (Hindi)	
<i>khatmi</i> (Sanskrit)	
Myrobalans	41
[<i>Terminalia chebula</i> , (Gaertner) Retz., Combretaceae & <i>Terminalia bellerica</i> , (Gaertner) Roxb., Combretaceae]	
<i>mirabolano</i> (Portuguese)	
<i>haraḍ</i> (Hindi)	
<i>haritakī</i> (Sanskrit)	
Night shade tree	42
[<i>Nyctanthes arbor-tristis</i> , L., Oleaceae]	
<i>árvore-triste</i> (Portuguese)	
<i>harsingār</i> (Hindi)	
<i>śephālīkā</i> (Sanskrit)	
Opium	46, 49, 57, 67, 69, 91, 94
[<i>Papaver somniferum</i> , L., Papaveraceae]	
<i>ópīo</i> , <i>anfiao</i> (Portuguese)	
<i>afīm</i> , <i>kaṣ-kaṣ</i> (Hindi)	
<i>ahiphena</i> (Sanskrit)	

Rhubarb	92
[<i>Rheum spp.</i> , L., Polygonaceae]	
<i>ruibarbo</i> (Portuguese)	
<i>revand, revandchini</i> (Hindi)	
Root of china	38-40
[<i>Smilax china</i> , (L.), Smilacaceae = <i>Smilax ferox</i> , Wallich]	
<i>pau-da-china, pau chinês</i> (Portuguese)	
<i>chob chini</i> (Hindi),	
<i>dvīpāntaravacā</i> (Sanskrit)	
<i>chūb-e-chīnī</i> (Persian)	
Sandalwood	74, 92
[<i>Santalum album</i> , L., Santalaceae]	
<i>sândalo</i> (Portuguese)	
<i>candan, safed candan</i> (Hindi)	
<i>candana</i> (Sanskrit)	
Snake root	36, 203, 204
[<i>Rauvolfia serpentina</i> , (L.), Benth. ex Kurz, Apocynaceae]	
<i>pau-de-cobra</i> (Portuguese)	
<i>pagal ki jadi, candrabhāgā</i> (Hindi)	
<i>sarpagandha</i> (Sanskrit)	
<i>rannetul</i> (Sinhalese)	
Sarsaparilla	92
[<i>Hemidesmus indicus</i> , (L.), R. Br., Asclepiadaceae]	
<i>salsaparrilha</i> (Portuguese)	
<i>anatmūl</i> (Hindi)	
<i>anantamūla</i> (Sanskrit)	
Tamarind	42, 92
[<i>Tamarindus indica</i> , L., Caesalpiniaceae]	
<i>tamarindo</i> (Portuguese)	

imlī (Hindi)

tintīḍikā, ciñcā (Sanskrit)

Turpeth

39

[*Operculina turpethum* (L.), Silva Manso, Convolvulaceae]

Turbite (Portuguese)

niśoṭh, tarbut (Hindi)

trivṛtā (Sanskrit)

Zedoary

93

[*Curcuma zedoaria*, (Christm.), Roscoe, Zingiberaceae]

zedoária (Portuguese)

kacūr, kacūrā (Hindi)

śaṭi (Sanskrit)